SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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Original Correspondence.

ON BOILER ACCIDENTS AND THEIR PREVENTION.

SIR,—The following is an abstract of a paper read before the North of England Institute of Mining Engineers, on Saturday, by Mr. D. P. Morison. The paper is only an introductory part of the subject of boiler accidents, and deals as a first instalment with the question of efficient inspection. The attention of the Legislature has already been largely given to this subject, and it will probably in future sessions be more prominently brought under notice.

The number of boilers in use in the year 1878 in the United Kingdom has been estimated at 200,000. Even this appears by the author of the paper to be an under statement. Where so many important interests are at stake and as it were controlled by the safe working of such a number of boilers it may be assumed that as much practical information as possible should be brought to bear on the subject, and the experience gained by past accidents should be used to avert, as far as that can be done, the possibility of future accidents. The present paper is divided into the three branches of—

1.—The necessity of efficient inspection.
2.—What is efficient inspection?
3.—The means of obtaining efficient inspection.

It is now generally considered that careful inspection by specially trained men for this purpose is the best preventitive of boiler explosions, even when other requisite precautions are taken, such as constructing with the best materials and good workmanship, moderate steam pressure, proper safety valves, hydraulic tests, and careful attendants and firing of the boiler. The lessened number of explosions under the system of periodical inspection attests the value of the principle, and will in a more extended form be the best safeguard in the future against accidents.

The number of boiler explosions and deaths and injuries resulting from them during the last ten years is shown below:—

	Boilers exploded.	Number killed.	Number injured.
1869	59	87	128
1870	70	85	138
1871	66	66	113
1872	74	50	137
1873	88	66	94
1874	76	77	198
1875	68	81	142
1876	39	93	110
1877	44	54	75
1878	46	47	84
Total	630	706	1219
Average	63	70	121

The following shows the number of boiler explosions from June, 1866, to June 1870, in Great Britain and foreign parts, under the various descriptions of boilers now in use.

	British.	Foreign.	Total.
Marine boiler	12	64	76
Cornish, Lancashire, and others with internal flue	84	3	87
Locomotive	10	68	78
Plain cylindrical, externally fired	54	3	57
Furnace, upright	8	0	8
Balloon, Haystack, Wagon, Butterley, Breeches tube, Elephant, and Trevithick	5	2	7
Portable, agricultural, upright, crane, and very small boilers	17	17	34
Heating, domestic, rag steamers, &c.	22	14	36
Others not classified	7	175	182
Total	219	346	565

Another table forms a summary of the causes of boiler explosions in Great Britain during the four years ending June 30, 1870:—

	Number of explosions.	Persons killed.	Persons injured.
1.—From faults in construction or in repairs	95	128	167
2.—Faults which should be detected by periodical examination	62	105	185
3.—Faults which should be prevented by careful attendants	54	79	84
4.—Extraneous or uncertain causes	8	3	14
Total	219	315	450

A large proportion of those accidents, especially those classified under Nos. 2 and 3, it is evident might have been averted by a system of careful periodical inspection.

The writer now deals with the second branch of the subject—What is efficient inspection? This may be described as acquiring a complete knowledge of a boiler in its entirety, as to the material of which it is made, its construction, its setting, and its management and general constitution. The inspection should be thoroughly independent of the persons in daily charge, and should be as frequent and complete as possible.

The Boiler Associations on the Continent have special rules approved by their respective Governments, all urging the necessity for intimate and detailed knowledge of the internal constitution or "temperament" of a boiler. The following are some of the points to be observed: Boiler explosions occur from natural deterioration of material, or from defects in construction, or from incapacity of those in charge. The interior examination of a boiler is the only reliable method of ascertaining its condition; when such examination is carefully made it usually affords the means of finding out the safety, or otherwise, of the boiler. Every separate part should be examined, because on the security of one part all the others depend, and the security of the boiler in its entirety.

The chief impediments in the carrying out of boiler inspection are their being externally smothered up with brick and stone work, or the clothing may prevent a leak being observed. The Cornish or one-flued boiler has too little space between the shell and flue at the sides and bottom either for a person to move about or to use a hammer. The Lancashire, or two-flued, boiler has not this defect—at the sides, at least—but another manhole is required to get at the space beneath the flues. The plain cylindrical boiler is the best to examine internally; the facility for examination is one of its chief recommendations. Most multitubular and locomotive boilers are too small to examine internally; this difficulty with them has led to many explosions.

The third branch of the subject is—The means of obtaining efficient inspection. Inspection is carried out in the following manner:—

1.—By private firm inspection.
2.—By association of firms, home and also foreign.
3.—By inspection companies.
4.—By inspection and assurance companies.
5.—A system of inspection under contemplation, which may be named Government inspection, by which the Legislature would undertake the registration and inspection of every boiler by specially authorised officials, may also be referred to.

The following is an estimate of the number of boilers in use in the United Kingdom, and the number insured:—

Estimated number on best authority	200,000
1.—Steam users	3,500
2.—Steam power	22,000
3.—National	7,000
4.—Midland	3,415
5.—Yorkshire	2,000
6.—Mutual	1,000
7.—London Mutual	1,000
8.—Newcastle	114
9.—Engine and boiler	500
10.—English and Scotch	—
Total insured	40,529

The general conclusions to be arrived at from the present introductory paper will be fully investigated in future communications promised by the author. The models illustrating the various causes of explosion, and the photographs and drawings, were the same which attracted considerable attention at the late American and Prussian exhibitions. M. E.

NOVA SCOTIA.

SIR,—Mining interests in Nova Scotia have shared in the depression which has of late affected most other productive and commercial occupations in this province as elsewhere throughout the British Empire. Yet with this, as with other interests, here as elsewhere, there seems reason to hope that the lowest point of depression has been reached, and even passed, and that now the tendency is upwards. The gloom which has hung over the coal mining interests of this province for years past has been deep indeed. Not a few collieries, as compared with the whole number in operation, were years since totally closed, whilst in the case of many others about being opened all operations were suspended. The cause was, of course, the virtual closing of the United Sates markets against the Nova Scotian coal—at a time, too, when its production had been largely stimulated by the commercial treaty with that country for several previous years in operation. This virtual closing of a principal market was rendered more unendurable by the fact that the coal owners of Nova Scotia were met even in their home markets of Canada, and especially in the province of Ontario, by free importations from the mines of the United States. The imposition, by the recently adopted Canadian tariff, of a small duty on imported coal has led a few to suppose, whilst many doubt, that the Nova Scotia coal trade will thus experience some relief. At all events, the colliery managers seem disposed to try the experiment. Hence we see an increasing activity in shipments of coal, especially to the provinces upon the St. Lawrence. Doubtless this depression in the coal trade will have taught the owners of mines some useful lessons. There can be no doubt that a greater expenditure than needful was formerly incurred in the mining and shipping of coal; and I fear it must be maintained that there is yet room for more and many economical appliances. Then, when mine owners take the solution of the question of freights into their own hands, and have their product sent to market in fleet steam colliers, they will have taken another long stride towards securing the profits for which they now repine.

As to the production of iron, the state of the trade in that metal for years past is sufficient to account for the fact that no new mining or smelting works have been opened in Nova Scotia, although it is well known that immense deposits of rich ore exist in many localities, several of them in the immediate vicinity of coal deposits. The Londonderry Iron Mines, in Colchester county, continue to be the only works of their kind in operation in this province. Of metalliferous mines other than gold I need say nothing, for there is really nothing to be said. The report as to manganese, gypsum, and even building stone, which have heretofore entered somewhat largely into the exports of the province, is, owing to the causes already mentioned, still far from satisfactory. It is natural to suppose that mining of the precious metals could be but slightly affected by any of the ordinary causes which produce depression in other industrial pursuits, since gold and silver are always in high demand. Nevertheless, the product of gold in Nova Scotia is now less in quantity than it was ten years since. For the six years commencing with 1865 there was a marked and continuous decline in the aggregate annual product of the gold mines. Then there commenced a slow and somewhat fluctuating improvement, yet still the total product for the last year (1878) was less than half that of 1867. This decline, with its as yet slow revival in the gold product, is owing to a combination of causes, which are well understood by those who have given their study to the subject. I know not that I need take up your space by describing them in detail. Let it suffice to say that this falling off in the aggregate product is not owing to any, 'running out" or other default in the mines, or to any unprofitableness in the working of them, or to any suspicion of either one or the other of these causes by those who have had opportunities of informing themselves as to the truth. Indeed, gold mining was never before so profitable, was never so nearly universally safe an operation in Nova Scotia as it is just now. The only reliable way of testing this matter is to ascertain what is the proportion between the yield of gold and the labour expended in producing it. Acting upon this principle we find that in 1877 the actual product of gold per man employed in and about the mines was $738. Last year the proportion was a little less, but during the present year, judging from present prospects, it will much exceed this.

To those whose conception of a real gold mining country are inseparably associated with ideas of enormous wealth—and to this class do most persons belong who have not had direct experience in such matters—the above results may seem very meagre. Nevertheless, I undertake to say that the mining record of no other gold-producing country in the world can, even for the past year (1878), show so favourable a result as that of Nova Scotia for the same period. It must be remembered that the above figures show the combined result of all the gold mining operations in Nova Scotia, not only the richest but the least productive, and even the wholly non-productive, if any there are. I should have said rather "all the known gold mining operations," since the aggregate referred to above are made from the Official Returns of gold reported to the Department of Mines for the payment of royalty. Of the quantity surreptitiously extracted and paying no royalty we can know nothing. I must still further add that in this calculation the gold is valued at only $18 an ounce, which is far below its average value in the London market. Nova Scotian gold, from which ever of its mining districts produced, is unsurpassed in purity by any found elsewhere in the world, and even unequalled by any other except, as is said, that of the Urals. I infer that it is but fair to add one-ninth to the $18 as the average price of an ounce of Nova Scotian gold, but this is a point upon which the ordinary reader of the *Mining Journal* can make the requisite corrections for himself.

It would seem that among prospective gold miners, as a general rule, the value of what I may call and what I have above represented in the case of Nova Scotia, general averages has slight effect in leading to an estimate of the attractions of an auriferous region. Men are more disposed to look to and to allow themselves to be dazzled by the accounts of individual instances of enormously rich "finds" of gold, or of special cases of great fortunes rapidly made by gold mining, closing their eyes to the many cases of failure, which on examination they might find associated with such special instances of good fortune, just as the unthinking multitude disposed to dabble in lotteries habitually fix their eyes upon the few great prizes which are possibly attainable, whilst oblivious to the vastness of the number of blanks which must be drawn. They prefer running great risks for the one chance of an enormous success rather than incur a very moderate risk for the reasonable certainty of a moderate success. Thus the Nova Scotian gold fields have never turned up the wondrous prizes which are often represented to have been hit upon, and which, doubtless, are sometimes discovered in other gold-bearing countries; yet, on the other hand, utter failure in mining is here scarcely known. During the last 15 years there has not been any industrial occupation followed in Nova Scotia, the results of which have been more nearly universally successful than gold mining as mining—that is, not merely speculating in mines. There is none now in which either the monied capitalist or the able-bodied and industrious labouring man can invest his means with a more reasonable prospect of success, and few, if any, in which that prospect is so fair. Gold mining has here subsided into the equability which characterises other ordinary occupations, and we hear less about it than in the early days when it was a novelty. Again, and as another reason why less is heard about these gold mines, the Provincial Department of Mines does not of late publish monthly and quarterly authoritative statements of the operations and results of mining, as was done in former years. Hence the Department is certainly remiss in what is due both to itself and to the public. The annual report of the Department, of course, gives the general result of mining operations throughout the province for the whole year, but as to knowledge of facts occurring within any fraction of that period, the enquirer must largely depend upon his own means of obtaining information.

Among the causes which ensure larger real profits to the miner than were attained in former years, even when the aggregate yield of gold was larger, a prominent place must be given to the comparative cheapness of everything for which the proprietor of a mine has to make outlay. The cost of labour, machinery, and everything which goes to make up miners' supplies is less than at any former period since gold mining was first carried on in Nova Scotia. To all this must be added as another, although indirect, aid to the increase of profits the great improvements in the facilities of communication between the mining districts and the great highways of general traffic without. Altogether the prospect from gold miners' point of view is just now very gratifying, and such it is by themselves admitted to be. That community, as a whole, never since it first existed in Nova Scotia evinced greater spirits than it does just now. Although gold mining has sobered down to a steady business, the mining community still has its occasional surges of more than wonted excitement; and these sometimes even communicate to the world without. Quite recently there have been important new discoveries in several of the districts, and notably in those of Sherbrooke and Montagu, which, added to the general prosperity of all the mines for many months previously, has caused no slight elation to all concerned. Among these I observe evidences of a more settled and immovable confidence in the future of Nova Scotia as a gold-producing country than could ever be seen before; and one frequently hears from them such emphatic utterances as—"We have not yet even begun to find the gold deposits of this country."

As to the character and promise of the new discoveries referred to, and as to any other particulars illustrating operations now going on within the several gold districts, I shall endeavour to furnish some useful information in my next. I am scarcely sufficiently supplied with the requisite facts at present. Moreover, this letter is long enough to be brought to a close. GNOME.

Halifax, July 22.

RICHMOND CONSOLIDATED MINING COMPANY.

SIR,—Some time since when these shares were on the rise to 14*l.* per share I wrote to the Journal warning buyers that the price was altogether too high in view of the system of operations pursued by the company; the shares have since been quoted 6¾. The practice of this company in refining "silver riches" or "base bullion" in the midst of the American desert is simply absurd viewed from a business point, and it would have been well for the shareholders if they had pocketed the loss of the cost of the refinery, and ceased to make "doré bars" two years since. There is a new feature, however, in connection with this business which should attract the earnest attention of shareholders. Hitherto the insuperable objection to the refining at Eureka has been the enormous cost of fuel, supplies being actually sent from England, a distance of over 15,000 miles. I observe, however, by a very interesting pamphlet, published by Mr. Walther and Co., of 17, Charles-street, St. James's, which can be had post free on application to them, that a splendid field or basin of bituminous coking coal has been discovered in what may be called the near vicinity to the Richmond mining district, and that railways are in course of construction to place this in full communication with the smelting and refining establishments.

It is to be hoped the Richmond Mining Company will lose no time in making contracts for supplies of cheap fuel. This is the only point which can justify their clerical error of refining at Eureka by being able to get "cheap fuel supply," and the shares will be enhanced greatly in value when communication is made by the railway with this great San Pete Valley coal district, and the effect generally upon the undertaking by this supply of cheap fuel will be to the shareholder— AN EYE-OPENER.

RICHMOND MINING COMPANY.

SIR,—Our directors have given us a dividend of 7s. 6d. per share, and they inform us the new furnaces and refinery are working with satisfactory results and increased economy; that the mine is yielding the usual quantity of ore without any signs of diminution, and that though silver has slightly increased in value lead has until very recently continued unusually low, but considerable improvement in its value has now taken place, and there is a fair prospect of its being maintained. The advance in silver and lead is so lightly touched upon that no one would suppose it has to any extent increased the company's net profits. I, therefore, beg to state that the advance in lead alone since the meeting in April last gives the company an increased profit of over 4*l.* per ton, the price then being 3½ cents per pound, and the present price 4¼ cents per pound. The advance in silver since same date has been 1½d. per oz., which on 25,000 ozs., the weekly produce of the mine, gives an additional profit of 130*l.* per week. The directors do not inform the shareholders of the fact that since the last meeting the freight of the lead by railway has been reduced $9¼ per ton, which gives the company an additional profit of that amount on their lead, as the company's bullion agent sells the lead for delivery in New York, and the company pays the freight of it thither. The mine produces on an average 200 tons of pig-lead per week.

Now I estimate that, comparing the present returns with the returns in April last, when the profits were about 2000*l.* per week, an additional profit of fully 1300*l.* per week is now being made, as the following statement conclusively proves:—

200 tons of lead per week, at 4*l.* per ton advance, additional profit per week	£ 800
25,000 ozs. of silver, at 1½d. per ounce advance, additional profit per week	130
$9¼ per ton reduction in freight of 200 tons per week, additional profit per week	395
Total additional weekly profit	£1325

Since the last meeting the debenture debt of 25,000*l.* has been paid off, and the estimated balance of assets over liabilities, which was then 19,000*l.*, is now, I believe, 30,000*l.*, whilst this week's run is $65,000; average grade of ore, 56¾; altogether one of the most satisfactory runs since the furnaces were started in December last.

Aug. 7. A. Z.

RICHMOND MINING COMPANY.

SIR,—I have been applied to by several shareholders to inform them whether I think the present dividend of 7s. 6d. is a wise one for the directors to declare under existing circumstances and contingencies. I think shareholders must allow that the following remarks on the working results of the seven months ended July are fair and conclusive on this point. On June 9, 1877, the managing director at Eureka wrote to the board as follows:—"Past experience has taught me that it is useless to run the furnaces on ore paying much under $60 per silver, gold, and lead together. We must get out $45 to $48 per ton to allow even a modest profit." On May 5, 1877, he also wrote:—"Never before have we smelted ore of such low grade continually for so many months. During the few months that the ore was of fair grade we did very well indeed (July and August for instance); but when the total assay (for silver, gold, and lead) fell to $55 or less per ton there was no margin for profit left."

It must be remembered that during this period (1877) silver averaged $1·20 per oz., and lead 6 c. per lb., whereas since January, 1879, silver has averaged only $1·10 per oz., and lead only 3½ c. per lb. During the past seven months ended July the company have smelted about 29,500 tons of ore, yielding $1,600,000 in gold, silver, and lead, or $54¼ per ton, according to the weekly published returns. With silver at nearly 10 c. or 5d. per oz., and lead nearly 3 c. per lb. or 12*l.* per ton less in 1879 than for the same period in 1877, *a fortiori* there can be "no margin for profit left" on ore assaying only $55 or less per ton.

As regards lead the Chairman at the last meeting, held on June 4 (see *Mining Journal* of June 7), stated that this formed the bulk of the company's ore product. "We make about 1000 tons of lead every month, and every cent per pound makes a difference in profit to us of 4*l.* per ton." If this statement is correct the shareholders will see how large an amount has been lost to them in the last seven months working if there were 1000 tons of lead marketed monthly. If there have been only 5000 tons made during this period it represents a loss of profit of 60,000*l.*

Looking at the large production of lead in the United States, and

the low prices which prevail, I think it is most surprising to find the Chairman and another director setting up another opposition lead producing company to the Richmond. I allude, of course, to the Missouri Lead Mining and Smelting Company, whose prospectus was published in the Journal of May 17. In this prospectus it is stated that the property is capable of yielding 1400 tons of galena, or 1000 tons of lead, monthly. The Missouri lead being free of antimony, bismuth, and arsenic is, of course, a much superior article to the Richmond, and the prospectus states that it can be produced and marketed at a cost of only 2 cents per pound, or 8*l.* per ton. It is said that no man can serve two masters or two seperate interests fairly, and, therefore, for the sake of the Richmond I hope the Chairman and the other director will either stick to the Richmond exclusively in mining concerns, or else "be off with their old love before they are on with the new."

The Eureka Consolidated Company, as I showed in my letter published in the *Mining Journal* of June 14, are evidently working with much greater economy and greater advantage to their shareholders than the Richmond seems to be capable of doing. The Eureka continues to pay $1, or 4s., in dividends every month, whilst the average price of the shares stands at $16, or 3*l.* 4s., per share. There are 50,000 shares in the Eureka Company and 54,000 in the Richmond, so that on the Eureka standard the real value of the Richmond shares from a dividend point of view, and from an economical one too, instead of $42, or 8*l.* 10s., per share, should be only 3*l.* 9s. The body of the ore extracted from the Richmond Mine during the past seven months would represent about 100 yards in length, 10 yards in width, and 15 yards in height. This is a mighty big hole in the ground, and at this rate of excavation the ore bowels of the mine must be soon emptied. On this account the directors ought to cut down the expenses and the salaries all round if the shareholders are to have a fair share of the profits, such as they are from $55 to $60 ore.—*Aug.* 7. R. M. Brereton.

COPPER MINING AT LAKE SUPERIOR.

Sir,—The product of the important Lake Superior copper mines for the month of June, as reported, was as follows:—

Calumet and Hecla	Tons 1271	250 lbs.
Osciola	151	1000
Franklin	137	58
Atlantic	129	1990
Quimay	119	100
Allorerz	85	0

For the six months ending June 30 the same mines have reported as follows, as per Portage Lake Gazette:—

Calumet and Hecla	Tons 7687	375 lbs.
Osciola	926	965
Franklin	810	905
Atlantic	793	1010
Quimay	760	1705
Allorerz	559	455

Besides these the Central Mine is to be counted good for 600 tons for the half-year. The yield of ingot from these mines will average probably 78 per cent. of their reported product, some of them running as high as 83 per cent.

I do not know if we are right in claiming the largest copper mine in the world or not, but we put in the claim under any circumstances. The products of the Calumet and Hecla for five years have just been made public in the paper named above:—

1874-5	Tons 13,219	1595 lbs. mineral	= Tons 10,352	783 lbs. ing.	
1875-6	14,073	1395	=	10,901	173
1876-7	14 135	114	=	10,802	1491
1877-8	15.528	1735	=	11,823	554
1878 9	16,464	911	=	12,548	882

The quantity of rock treated has been about the same—about 22,000 tons monthly; the increase in product being attributable to improved quality of rock. The mine pays quarterly dividends of $5 per share on 80,000 shares of stock, or $1,600,000 per year, and can do so indefinitely.

The Osciola has just declared a dividend of $1·50 per share, or $60,000; it is nine months since the previous one was paid. Calumet dividend is about due, and the stock sells at $190 per share, and will likely see $200, so that it is paying but little over 10 per cent. on its cost. This shows whether people in the United States can realise when they have a good mine or not. There is nothing specially new calling for attention in the copper country just now. The mines are maintaining their product, the important ones are making a little money, but there is nothing new starting up.

In machinery, the Calumet and Hecla are about to test a new stamps; at present they are running heads that will crush 135 tons of rock daily. The new machinery is supposed to be of greater capacity, and is expected to do its work cheaper. Cost of stamping in the various mills in the district varies from 45 c. to 75 c. per ton, varying according to the character of the rock treated.

The labour market is fairly supplied, though good miners need not be long without employment. A more lively feeling in the iron mines, combined with an exodus to Colorado and the Black Hills, cleared off all the surplus labour this spring. Latterly the outgoing seems to have ceased, and there has been, as usual, quite a number of new arrivals.—*Calumet, Mich., U.S.A.* J. D.

CALCINING COPPER AND OTHER SULPHIDES.

Sir,—From the large amount of practical experience which Mr. Peter Spence, of Manchester, has had in the treatment of minerals it may be presumed that his new invention for calcining copper and other ores containing sulphur will prove economic and useful; so that, considering the difficulty at present experienced in making copper mines return profits to the shareholders, I think miners should give it a trial. The present is a modification of his invention of 1868, and one of the leading modifications consists in the use of several furnace beds instead of one. These beds he proposes to build one above another with floors of one tile in breadth, supported on side walls, and of convenient length. A rake travels on each bed, and these rakes run all together or parallel to one another, but by the action of the ploughs forming the teeth, while one rake is conveying the material in one direction the other is passing it in the reverse direction. The series of racks are framed together, and all travel by the same motion, such motion being effected by suitable shaft and gearing situate on the outside of the furnace, or of two or more combined furnaces. The alternate action and rest are substantially as in the former patent. He now proposes to effect a self-acting feed of the material by the use of a hopper with a winged bottom which is partly turned at each travelling motion of the rakes, by which means regulated quantities are passed into the furnace.

The material is carried by the rakes along the top bed until it falls through the opening on to the second bed; it then passes in the reverse direction until it falls through an opening on to the third bed, and so on through the series of floors until it falls out of the furnace. The rakes are constantly inside the furnace, but when not travelling they lie in a comparatively cool situation; they travel on wheels upon rails built into the furnace. On commencing operations the furnace must be artificially heated, but no external heat is required in working. By the above described improvements he effects a complete calcination or roasting of the materials, and is enabled to treat them according to the second part of his invention:—After the sulphur has been driven off and utilised in the ordinary manner from ores containing copper, he takes the calcined material, and instead of, as now practised, again calcining or treating it with common salt or other chloride or hydro-chloric acid, he places it in suitable vessels, and submits it to the action of water, by which means he obtains the copper in solution as sulphate of copper.

I think it will be generally acknowledged that calcination of the ore is a subject to which the Cornish miners pay too little attention, and thus they frequently have to make an allowance to the smelter, which they do by accepting a lower price for their ores, for doing that which they could more cheaply do themselves. I quite believe that by judicious calcination and subsequent treatment of the ore by such a washing process as a chemist like Mr. Spence would use the miners' profits would be much increased. At all events those who are raising ores which they find it difficult to treat would, I should think, do well to consult an experienced manufacturing chemist on the matter.—*Chorley, Aug.* 2. Cornishman.

NEW ROCK TUNNELLING APPARATUS.

Sir,—It will be remembered that one of the earliest inventors of rock boring machinery was Capt. H. N. Penrice, and especially in connection with tunnelling machines his name has constantly been before the public. That both he and Capt. Beaumont were a dozen years since working upon a wrong principle no one now doubts, but whilst Capt. Beaumont soon followed more sensible inventors, and sold a machine that would do some work, Capt. Penrice has until quite recently clung to the original system, and, therefore, done comparatively little. He now proposes a ram carried upon a massive frame approximately of semi-circular section, and of a size corresponding to the cut made by the head. He fixes on this machine four rock drilling machines, the front ends of which are carried on a light frame fixed temporarily against the rock, the rear ends resting on the tunnelling machine, which thus takes the thrust of the drilling cylinders. Three of these machines drill three holes on ahead, one on each side of the tunnelling machine, and one above it. These holes are inclined outwards at a small angle, and they afterwards receive blasting charges, by the explosion of which the rock is forced inwards and downwards in the leading cavity.

Where the rock is of a very hard nature, in place of producing the leading cavity or machine tunnel entirely by means of the tunnelling machine, as heretofore, he saves much time and much wear of tools by drilling with a fourth machine simultaneously with the others a hole centrally in advance of the tunnelling machine. When the holes are some feet in he removes the drilling machines and charges the central hole with blasting gelatine, or the most efficient explosive which he is able to obtain, and he fires the chrage, which has the effect of enlarging the cavity within, but without much increasing the size of the mouth. He charges the cavity and fires it a second and a third time, the effect of which is to increase its size within approximately to the size required, but leaving the entrance but little enlarged. He now brings the tunnelling machine forward and cuts through the neck. This, even in the hardest rock, is effected with comparative ease, as the rock which remains to be cut away after firing the charges is so softened by the repeated explosions as to be easily cut through. The leading opening being thus formed, the sides and top are forced in by blasting charges in the holes at the sides and top, as already described. He generally prefers to limit himself to these four blasting holes, but a larger number may be employed.

Capt. Penrice certainly seems to be coming round to the modern practice, but if he had seen the Hoosac, the St. Gothard, or the Sutro tunnels he could make still further improvements. Vigorite.
Aug. 4.

CROWN LANDS—WOODS AND FORESTS.

Sir,—I was pleased to read in the Journal of last week the report of the deputation that waited on the Duke of Devonshire on the question of dues on lead mines of Derbyshire; we want a similar deputation to wait on the Hon. J. K. Howard on the question of dues and the management of the lands in Wales, generally called by mining men Crown Lands. If the present management goes on the amount paid into the Exchequer will soon be *nil*; as instead of encouraging native labour every difficulty appears to be put in the way. The usual course is, if a discovery of lead, slate, or any mineral substance is made, and the finder of the mineral applies for a take note, he must first send with his application 5*l.* before he gets the take-note, so that before he can legally be in possession generally takes three months, and as the take-note is for 12 months, one quarter of the time is gone. If a renewal is wished for 10*l.* is generally required, and should the holder of the take-note be fortunate enough to discover anything of value he must find two or more persons of whom the Crown agents approve, or he may lose all he may have expended. Should he be able to find two persons whom the Crown will accept, they require one-fourth part of any money the lease may be sold for. The 5*l.* paid for the take-note goes to the officials for fees, and not to the revenue of the country. It would be very interesting to see a statement of the amount of these fees, and who receives them. About the time of the gold mania near Dolgelly some years ago it was said that as many as 4000 or 5000 of the take-notes were issued in one year. It is quite time some reform was made in the office of the Woods and Forests, as a large amount of revenue is lost because so few persons venture to speculate on Crown Lands under the present management.

Plynlimmon.

LORDS' DUES.

Sir,—Although the subject has been well treated by several correspondents it is of such import to many thousands of our population engaged in mining, smelting, carrying, and commerce as to call for further agitation on so momentous a question as lords' dues in connection with the very existence of our mining industry. We are all aware of the existence of good lords of manors as well as a majority of quite the reverse, who look upon a mine as a pigeon to be plucked, who not content to extort the greatest possible amount of fixed dues upon the gross produce of the mine, whether paying or not, often exact double or treble the real value of the land for its necessities. Many of us are also, doubtless, aware of one, or may be more, liberal lords alive to the pressure of the times, their own interests, and those employed upon their estates, who have either given up their dues entirely until trade shall have revived, or have accepted a reduction from 1 8th to 1-30th for a given number of years. Surely the lord of the manor and the capitalist, either individual or company, have similar interests in view—the prosperity of "the mine." Therefore, should they not in properly adjusted proportions reap the benefit of their investments in land or money from the net profits of the concern?

When dues, rates, &c., were instituted the adventurer was protected by the State from undue competition by import duties on foreign ores and metals. Free trade did away with that, and however beneficial it might have been in its day there can be no doubt that if it is to be maintained the lords of manors must consent to a very considerable revision of their various charges, or British mining must inevitably soon become an industry of the past. It seems, therefore, with present prices to be a battle between free trade and dues, and if the latter are to remain intact it behoves the lords to exert their influence with the Government to re-establish the late import duties on ores and metals for the support of our mining industry, the protection of my class, and of— An Adventurer.
Aug. 1.

A CORRECTION NEEDED.

Sir,—A typographical error occurs in my letter in the Supplement to the Journal of last week, which alters the meaning of what I intended to convey so materially that I beg leave to call your attention to it. My form of expression was—"Unless you, Sir, will be good enough to add your testimony in a foot note to this—*letter* was intended—corroborative of my assertion that I did not write the letter referred to," &c., but instead of that your typo has rendered it—"Unless you, Sir, will be good enough to add your testimony in a foot note to this 'corroboration' of my assertion," &c., thereby placing me in the unenviable position of not knowing that the repetition of a statement was not its corroboration. I asked you, Sir, to corroborate my statement "that I did not write the letter on the Llanrwst District published in the Supplement to the Journal of June 21," instead of placing myself in the ridiculous position of appearing as a self-asserting corroborator. Your having failed to comply with my request, which if complied with would have extinguished the delusion under which your North Wales correspondent laboured, and his enthusiasm together has given him an advantage somewhat at my expense in that your declining to endorse me at my publicly expressed desire tacitly endorses him and his egregious delusion. You, Sir, certainly know who wrote the obnoxious letter, the authorship of which I have been so persistently charged with, in spite of my most earnest protestations to the contrary, that I think I ask no more than bare justice at your hands in requesting you to promptly exonerate me from what now assumes the dimensions of a tacitly corroborated falsehood, which your North Wales Correspondent has without any cause and so little reason for suspicion so persistently attributed to me.

No one, I think, whose feelings are unprejudiced and whose judgment was unperverted could have preferred and persisted in preferring such a charge against me, as the smallest modicum of common sense, if permitted to operate untrammelled, would have dictated the very opposite conclusion, but as things go nowadays there is no accounting for the schemes of some men and most mice.

Llanrwst Lead Mine, August 6. Robert Knapp.

[We can have no hesitation in stating that Captain Knapp did not write the letter to which he alludes.]

STRIKES, AND THE RIGHTS OF LABOUR.

Sir,—In the *Mining Journal* of last week a correspondent of the city of Truro rejoices that the directors of Great Laxey have "stuck to their own terms," and have not given way to the "unreasonable demands" of the men. In common fairness to the men of Great Laxey it is due to them to have the fact plainly stated that, whether just or unjust, the demands do not emanate from them, but from the directors, and whatever may be thought of the lamentable dispute on the one side or on the other, it is a fact beyond all controversy, and one worthy to be particularly noted in mining records, that no such set of rules and regulations as those published by the directors of Great Laxey in the *Mining Journal* some months since had ever before been seen or heard of in the Isle of Man, or in the great mining county of Cornwall, from which county the remarkable statement referred to is dated. A Cornishman.
August 6.

THE SCIENCE OF MINING.

Sir,—Without referring to the writings of Mr. Knapp, whose displeasure I do not again wish to incur, I may state that I am of opinion that the true science of mining during the continuation of these depressed times consists in taking advantage of the cheapness of labour, &c., and sinking shafts, driving levels, &c., laying down tramways, skip-roads, &c.; in short, opening up the mines of the country, and adding to reserves of ore. Explorations, also, can never be effected more cheaply than at present, when materials of every kind are at so low a figure, and men's wages at a minimum. Mining companies, syndicates, and individuals who are so blind as not to take advantage of the times are to my mind much to blame, as 10,000*l.* judiciously expended in opening up mines now will perform more work and add more value to their properties than the expenditure of 15,000*l.* in ordinary times, when trade and commerce are at their normal state. Justicia.
Newcastle-on-Tyne, Aug. 6.

WHEAL ELIZA TIN MINE.

Sir,—I am pleased to correct the statistics respecting Wheal Eliza, for I am informed officially that the dividends have been 7680*l.* instead of 1500*l.*—as stated in my letter in the Journal of July 26—in excess of outlay; the latter being 18,432*l.*, and the former 26,112*l.* The dividends have been 33 per cent. per annum during all the depression, although the tin ore for the past half averaged only 37*l.* 17s. 4d., still the costs of production, including delivery to smelters, was only 25*l.* a ton of ore, showing a profit of over 50 per cent. As I observed, the machinery in every department is most efficient and economical, and the fact that dressed ore can be produced and brought to market at 25*l.* a ton is a perfect demonstration of the fact. I heartily wish the management continued success, as the example of progress and economy combined thus established should stimulate others to attempt and achieve equal results. R. Tredinnick,
38, *Cornhill, London, Aug.* 5. Consulting Mining Engineer.

PARYS COPPER CORPORATION.

Sir,—It is with much regret that I notice in last Saturday's Journal Mr. F. R. Wilson's reply to my letter of the 23rd ult. It will be remembered that gentlemen having declared certain statements I made at the recent meeting to be incorrect, I furnished through your columns a substantiation of what I had stated, and thereupon requested Mr Wilson to withdraw his aspersions. Instead of so doing he contents himself with a blunt refusal to adopt the only honourable course open to him. Unable to sustain and unwilling to retract his accusations, he has placed himself in so ridiculous a position that further comment would be an abuse of your space and waste of my time. Messrs. Watson Brothers, referring to the correspondence, inform me that our "directors (whoever these unknown gentlemen may be) were not the only indignant persons at the statements which had been made by me at the Parys meeting of Feb. 14, 1878, with reference to South Darren. No report of these statements was contained in the accounts of the meeting published in the Journal, and as some controversy was raised by your editorial allusions to my remarks, I think I may complain of the want of ingeniousness on Messrs. Watson's part in avoiding reference to a letter from me which appeared in the Journal of March 2, 1878, from which I extract the following:—"What I stated was that owing to improvement in the machinery, and a better system of management generally, our profit for February was expected to be 500*l.*, not that we are making a monthly profit of that amount. The February sale included a three months parcel of copper, in addition to the usual monthly returns; the average profit would, therefore, be about 300*l.* a month."

In the summer of 1876 (immediately previous to the alterations above mentioned) our monthly loss was 150*l.* to 200*l.*; adding to this the February profit, we approach very nearly to the gain of 700*l.* This explanation will, I trust, assuage the indignation of Messrs. Watson, their directors, and the other persons. Messrs. Watson next invite attention to the South Darren accounts just issued, and as they omit all reference to several important points, all which were noted in the accounts and reports from which they quote, I shall be happy to join them in the examination. The accounts they say show a loss on the six months of 328*l.* 4s. 11d., but they do not say (1) that the audited supplemental statement to June 30 showed that the credit balance in the five weeks to that date had increased 267*l.*, and that the total discrepancy between expenditure and returns from Dec. 5, 1878, amount to 61*l.*—2. That during three months of the six they selected dressing had been almost entirely stopped by a winter of unparalleled severity, and that the agent reported a total suspension of operations in the lower levels (containing the principal ore ground) during two months, owing to a breakage of the bob.—3. That during the interruption of underground work opportunity was taken to thoroughly repair, and for 7 fms. to retimber the shaft; that slime pits were enlarged, the drawing machine improved, new water-courses made, and which have increased the value of the property by 500*l.* at least.—4. That this and every other expenditure, including legal expenses for obtaining a new lease, and other matters, had been charged to revenue. I may add that with large reserves of ore, diminishing cost, and increasing returns, we have every hope of realising the expectations expressed—"that the profits will allow a dividend to be paid in a short time," the bad price of metal notwithstanding.

If Messrs. Watson really wished to examine the affairs of this company the above particulars should surely have been given, instead of a suppression of part of the accounts and a vague prediction that they would be told the loss was due "to the drop in the price of lead and other unforeseen circumstances." I cordially endorse Messrs. Watson's condemnation of any case of "suppressio veri suggestio falsi," and I am quite in accord with them as to the mischief likely to result from the meddlesome interference of ignorant persons, but to which count will Messrs. Watson plead guilty on the present occasion?

I have entered thus fully into South Darren matters in response to Messrs. Watson's challenge. The profit or loss resulting from that company's operations is, however, really quite beside the question whether the Parys expenses were excessive as compared with other mines. No man can command success, but all may deserve it. Had the failure of the late Parys resulted solely from the inherent poverty of the mine and the depressed price of copper we should have had

no cause of complaint, although we might have regretted the loss of our capital. My contention has been and is that with proper supervision the sacrifices entailed on the shareholders would have been unnecessary, and this Messrs. Watson do not attempt to disprove. I have previously mentioned some of the reductions effected while I was a member of the late board, and I may add as proof that I was willing to bear my share of the economies I advocated. I offered without remuneration in Morfa Du to serve as a director, and in Parys the fees were reduced 33 per cent. Messrs. Watson state that the reduction in the cost of Parys was owing to the fall in copper, and not to the influence of Mr. Bush. Was it only after my election, then, that the directors became aware of the cost of their stopes and the price of copper? THOMAS BUSH.

Lavender Bank, Farningham, August 5.

CARDIGANSHIRE MINES—PREDICTIONS.

SIR,—A very few months have passed over our heads since I was criticised rather severely for expressing an opinion that at the South Cambrian Mine, as depth was attained, the blende would give place to lead ore. At that time there was not a particle of lead ore contained in the veins then to be seen, but it was rich in blende, and it was so represented. Let us look at the result. In the *Mining Journal* under date Aug. 2. the agent's report, dated July 30, says—"The lode in the adit level east is steadily improving, composed of quartz, gossan, blende, and silver-lead ore, yielding of the latter 2½ tons per fathom." At the Cambrian Mines I predicted a rich course of copper at Esgair Ffraith, and was ridiculed by a majority of the mining magnates of this county for so doing; but let us look at the report of these mines in the *Mining Journal* of the same date (Aug. 2), and the report bearing date July 30 also, where the agent states—"The copper part of the lode in the bottom of the engine-shaft continues to be 6 ft. wide. In the 70 yard level, east of shaft, the lode will produce 2 tons of copper ore per yard. In the 20 yard level east the lode is composed of gossan, mixed with copper ore." It is my object in writing this letter to attract the attention of parties to the results thus realised, for to a person of experience, and whose whole study and attention have been devoted to the working of the veins and their appearances at surface and in gaining depth, it should be a comparatively easy matter for him to state very nearly accurate what should occur, and to prognosticate almost with certainty what the levels at their different depths should yield. For instance, I consider it a moral certainty that as depth is attained in the South Cambrian Mine the lode will go on increasing in richness until, instead of yielding 2½ tons of silver-lead ore per fathom at the deep adit level, it will at the 60 fm. level yield 10 tons per fathom. Perhaps at Cambrian or Esgair Ffraith the great body has been actually reached, for 6 ft. of rich solid copper ore, for it requires nothing but crushing, is as much almost as can be expected, and I was going to say desired, but our desires are never satisfied; but be that as it may there can be no doubt on the mind of anyone who has attentively studied the lode and its component parts at surface that this is only the beginning of the body of copper ore, and that it will last for I may say an immense depth before giving place to lead ore. Its length also must be continuous and without a break for certainly more than 150 fms. If any doubt is entertained by any of your readers as to my accurate reading of what has really come to pass, I would refer them to the respective secretaries to each of these companies, and to my reports on the starting of them by each.

What a different picture would be presented to-day had the babbling of some gentry been listened to. Why, not a man would have been employed in either of them, and the places would now be lying dead and dormant where now all is life and activity. I sometimes, Mr. Editor, cannot refrain from thinking that these either unthinking or really unwise philosophers should be compelled to keep silence, or at least before they spoke some reasons should be adduced for their ill omens before they appear in print. I must not carry this letter to too great a length, but suffice it to say that a man who really understands the lodes of Cardiganshire, and will and has paid proper attention to the results obtained from them, can ascertain what he is likely to get from them quite as accurately as a farmer can make a calculation as to the quantity of grain his crops are likely to yield him after the head had been thoroughly developed.

Before closing this I will make one or two more predictions. Let us take the Bryn Glas Mine. Who but a maniac can think but at this property, and looking at the character of the lodes, their junctions, and their immense yield near the surface, that in the extension of their present levels and the deepening of the mine one of the finest properties ever worked in the Principality must be the result. I am as certain it will be so as that I am writing on this paper, and as the mine has got into the hands of a party who means to give it a spirited working, a few months will more than realise my utmost expectations. Let us take one more instance, and I have done. Cwm Pryf is a mine situated on the north bank of the River Rheidol, and right in a line between Goginan and Frongoch, which have yielded millions of pounds worth of lead and silver. Cwm Pryf, for that was its original name, yielded thousands of tons of silver-lead ore, and gave large profits, when the ore was rudely excavated and bruised down by hand power, yet it proved unprofitable in the hands of a company who worked it up to within a very recent period. The simple fact is they mistook the arm for the body or the branch for the trunk of the tree, and left entire all the ore ground from which the old miners obtained their profits, and I will prove it so, or my name is not— ABSALOM FRANCIS.

Goginan, Aug. 5.

[For remainder of Original Correspondence, see to-day's Journal.]

FOREIGN MINING AND METALLURGY.

As regards the Belgian coal trade we have to report that M. Quenon-Rupert, of Pâturages, has obtained a contract for coal required for the Belgian State Railways, at 4s. 10d. a ton. During the second half of last year Belgium had 160 collieries in activity, while 292 were inactive. The number of working miners employed was 97,200; they received an average remuneration of 2s. 5d. per day, and effected a total production of 7,568,000 tons during the six months.

Several adjudications have taken place during the last few days on account of the Belgian State Railways. These adjudications afforded further proofs of the general depression and scramble for work to which Belgian industries have now to submit. Thus, in an adjudication for the ironwork required in connection with the renewal with iron of certain bridges in the neighbourhood of Termonde the lowest tender was 1587*l.*, or 23 per cent. below the official estimate, which was 2060*l.* Old rails have been taken at 2*l.* 12s. to 2*l.* 16s. per ton. An official return shows that there were 17 blast-furnaces in activity in Belgium in the second half of 1878, and that the production of pig effected during the six months was 266,600 tons. The value of this production was 579,560*l.* During the same period Belgium had 46 ironworks in activity; the production of these works was 209,000 tons, of the average value of about 6*l.* per ton. We learn from Catalonia (Spain) that a Belgian company proposes to establish blast-furnaces at Sans, in the neighbourhood of the Gava ironstone mines.

The French General Tariff Commission has held a lengthened sitting at Versailles, and has discussed at considerable length the duties to be imposed on metals and metallurgical products entering France. The general tendency of the changes made has been towards an increase of duties. The imports of iron and steel into France in the first half of this year presented a diminution of 15,400 tons, or more than 12 per cent. as compared with the corresponding period of 1878. The diminution occurred solely under the head of pig, iron, and plates. The imports of steel presented a slight augmentation. The exports of iron and steel from France in the first half of this year showed an increase of 12,000 tons, or more than 15 per cent., as compared with the corresponding period of 1878. There has been little or no change in the quotations current for iron at Paris.

As regards the French coal trade it must be observed that business has been inactive in the Paris coal market. In the Nord and the Pas de Calais there has been some uneasiness, as it is feared that transactions will be checked on account of the sugarworks, which may find their operations impeded by the present indifferent condition of beetroot. The plants have risen badly, and are generally weak; in fact, only half a crop is talked of. Under these circumstances the proprietors of sugarworks have not unnaturally been giving out orders very sparingly. Notwithstanding all this colliery shares have been tending upwards rather than otherwise in France, while shares in French iron and mechanical companies have been drooping. The Carvin Mines Company has declared a dividend of 12s. per share; the payment of this dividend was commenced on Thursday. The company has formed reserves to the amount of 8000*l.*

Further progress in the direction of ascertaining whether India is to be one of the sources of gold supply is reported. The company working in trust for the estate of Messrs. Nicol, Fleming, and Co. has commenced operations in the Ootacamund district. A shaft intended to be 400 ft. deep is being sunk. It is stated that there is a prospect of a mining department being established by the Indian Government.

The extreme severity of the depression in the Belgian iron trade is shown by official returns for the second half of 1878, just published in the Moniteur Belge. The number of establishments with blast furnaces in activity was 17, while 12 concerns were entirely silent. Of the total number of blast furnaces in Belgium 29 were in use and 48 were damped out. The number of workmen employed was 2865. The production of foundry pig-iron was 13,600 tons, valued at 58s. per ton; the production of forge pig-iron was 253,000 tons, valued at 42s. 8d. per ton.

A serious accident has occurred on the Ludwig Glueck Mine, which forms a part of the extensive collieries at Zabrze, in Prussia, through the irruption of water into the pit. Two miners have been brought up dead, and one severely injured, and eleven more are buried in the ruins caused by the floods.

THE SCOTCH MINING SHARE MARKET—WEEKLY REPORT AND LIST OF PRICES.

During the past week, although a more assured feeling regarding the future of trade has been entertained, the actual condition remains as inanimate as ever. The money market continues quiet, but owing to the uncertain trade prospects the business doing in shares has not been important; however, within the last day or two there have been some signs of prices improving.

In shares of coal and iron companies, Ebbw Vale have advanced 5s. per share on the week, while Bolckow, Vaughan, A, are reduced 3*l.*, and Monkland 1s. Benhars fell to 22s., but are since firmer. There has at last been a sudden rise in the price of coal, owing to the men lessening the output by working only four instead of six days a week, a policy which has already materially reduced the stocks of coal. The Sandwell Park Colliery intimates a dividend of 5 per cent. for the last half-year. A new company has been formed in the North of England called the Evenwood Coal and Iron Company (Limited) to purchase the Evenwood Collieries at Slapworth Ironstone Mines and Works. Andrew Knowles and Sons are at 12¼ dis. Ashton Vale, 90s. Barrow Hematite, 102. Bilbao, 11; ditto, 6 per cent. preference (35*l.* paid), 25. Bolckow, Vaughan (A), 52; ditto (stock), 90; ditto (B), 28¾. Cardiff and Swansea, 1*l.* Carnforth, 80. Chillington, 40s. to 45s. Consett, 15½. Darlington, 15s. Ebbw Vale, 35s. to 45s. Great Western (B), 35s. John Brown and Company, 43¾ dis. Lehigh and Wilkes-Barre, 94. Marbella, 25s. to 30s. Monkland (preference), 47s. 6d. Muntz's Metal, 11⅞. Newport Abercarn, 87s. 6d. North Londsdale, 70. Omoa and Cleland, 8s. 6d. Rhymney, 10½. Scottish Australian, 36s. 3d. to 38s. 9d. Sheepbridge, 51 dis. South Wales, 45s. Tredegar (A), 13. Ulverston, 9. West Cumberland, 5.

In shares of foreign copper and lead companies the principal movements are reductions of 1*l.* per shares on Tharsis (7*l.* paid), and 12s. 6d. on the 10*l.* paid shares, which touched 21¾, but are now firmer. The profits of the Panulcillo Company for six months ended June 30 are stated to be nearly 8000*l.* net. A meeting of the Prussian Mining Company will be held on the 10th inst. Alamillos are at 25s. Cape, 27 to 28. English and Australian, 22s. 6d. Fortuna, 7.5s. Rio Tinto, 5 per cent., 67½ to 68. Yorke Peninsula, 3s. 9d.; and ditto (preference), 5s. to 10s.

Shares of home mines are firmer, though no great increase of business yet in them. The Mellanear Copper Company intimate a dividend of 2s. per share (payable 20th inst.) from the half-year's profits, which compares with 3s. at this time last year. The new discovery at Gorsedd and Merllyn, it would be noticed, was valued at one time lately at 4 to 5 tons per fathom. Cook's Kitchen are at 35s. East Van, 22s. 6d. Great Laxey, 15 to 16. Killifreth, 4s. 6d. Marke Valley, 10s. Red Rock, 30s. South Caradon, 50. South Condurrow, 12. Tankerville, 50s. Tincroft, 8¼. Van, 15. West Tolgus, 18. West Frances, 5¼. Wheal Basset, 90s. Wheal Crebor, 50s. Wheal Kitty (St. Agnes), 3s.

There is no important alteration in shares of gold and silver mines. Richmond have remained about 8⅛ all the week. This company declares a dividend of 7s. 6d. per share, payable August 8, which compares with 10s. at this time last year. The mine is stated not to show signs of falling off, and this week's run is $55,000. The Pestarena United gold returns for July are 672 ozs., and the average yield 16 dwts. 8½ grs. Australasian Mines are 3s. to 5s. Colorado, 30s. Don Pedro, 12s. Eberhardt, 40s. Exchequer, 2s. 6d. to 5s. Flagstaff, 2s. 6d. to 5s. Frontino, 40s. I X L, 2s. 6d. to 5s. Javali, 5s. to 7s. Last Chance, 10s. New Zealand Kapanga, 6s. 3d. Port Phillip, 9s. to 11s. Pestarena United, 3s. 6d. to 4s. 6d.; ditto 12½ per cent. (preference), 17s. to 19s. St. John del Rey, 265. Sierra Buttes, 42s. 6d. United Mexican, 55s.

In shares of oil companies the only alteration is in Young's Paraffin, which are 2s. 6d. higher per share—at 13¾. New Patent Candle, 21½.

In shares of miscellaneous companies there is a reduction of 10s. per share on Phospho-Guano, at 5¼. Milner's Safe Company announce a dividend of 7½ per cent. for last year. Earle's Shipbuilding are at 24½ dis. In wagon companies the shares prices are without any material alteration to notice. The following dividends have been announced:—Railway Rolling Stock, 3 per cent. on the ordinary and 6 per cent. on preference shares; Union Rolling Stock, 10 per cent. on ordinary and 6 per cent. on preference share; and Yorkshire, 5 per cent. for the half-year. Prices are:—Birmingham, 12¾; Bristol, 45s. dis.; Bristol and South Wales, 55s. prem.; Gloucester, 5¼; Lancaster, 75s.; Metropolitan, 32s. 6d. prem.; Midland, 8; Railway Carriage, 70s.; Scottish, 9½; Swansea, 30s.; Western, 50s.; and United States Rolling Stock, 15¼. Chemical companies shares easier, except Lawe's (preference). Langdale's at 72s. 6d.; Lawe's, 7½; Newcastle, 37s. 6d; Odams, 17½; and Western Counties, 12.

SUMBURGH MINING COMPANY (Limited).—A company has been formed under this name for taking over and continuing to work the copper and other minerals contained in the parish of Sandwich, in the Shetland Isles, held at the low dead rent of 30*l.* per annum. The surface area is about 20 square miles. The company is a going concern, which may reasonably be expected to earn satisfactory dividends at once, with the prospect of an increase as the development of the mines proceeds. The properties have been reported on by several eminent mining engineers, and they are of opinion that as greater depth is attained the value of the lodes will improve. The lease has 25 years to run, and the royalty is 1 10th of the crude ore at the pit's mouth. The capital is 60,000*l.*, in 10*l.* shares, divided into 2500 deferred 5 per cent. for the vendor and 3500 preferred 7 per cent. shares, which are for the public. The board of directors includes Alderman Sir Thomas Dakin and the Chairman of the Richmond Mine, as well as several other well-known gentlemen.

MINING COMPANY OF IRELAND.—The last meeting of this company was rather a dismal one. The operations for the half-year ended in a loss of 2429*l.*, according to the report, on the company's five mines. Knockmahon is closed, and being surrendered to the lessor. Silveardagh Colliery shows a profit of 49*l.* Duhallow Collieries have incurred a loss of 50*l.* Luganure Mines also show a loss of 1567*l.*, and Ballycorus likewise a loss. It is thought the company's expenses for directors and office should be reduced.

CENTRAL PACIFIC COAL AND COKE COMPANY (Limited).—This company owns a coal field containing several seams of coal. The principal one, to which operations are at present confined, averages about 4 ft. in thickness of good bituminous coal, and has been opened upon by adit levels driven into the hill at four different points of the coal field, and its extent and quality proved throughout the entire property, a length of 11½ miles. The total amount of coal in the field is estimated at upwards of 30,000,000 tons. The requisite machinery, &c., for working has been erected. This is believed to be a thoroughly honest *bona fide* undertaking. The facts are, shortly, that the company owns this large coal field with exceptional advantages as to market and profits, but which is comparatively useless without railway communication. Therefore, they have purchased the whole of the San Pedro Valley Railway Company, and in order to complete the railway they are issuing 8 pet cent. first mortgage bonds. They give those debentures a first charge over the whole of their property, standing aside altogether till they are paid. As further security, they deposit 100,000*l.* in shares in the hands of the trustees, and guarantee the fulfilment of the contract, thus giving the debentures a large preponderance of votes. The bonds are for 100*l.* each, issued at 90*l.*, bear 8 per cent. interest payable half-yearly by coupons, and are redeemable at par by annual drawings commencing in 1882.

The following calculations show the yield per cent. on money invested at present prices in the shares named, based upon the last average yearly dividends being maintained:—In shares of iron and coal companies, Andrew Knowles and Sons would yield 11⅛, Arniston 6⅝, Bolckow Vaughan (A) 5⅛, ditto (stock) 5⅞, ditto (B) 5⅛, Brown, Bayley, and Dixon, 9⅜, Cairntable 15⅜, Charles Cammel and Company 8⅛, ditto 6 per cent. (debentures) 6, ditto 5 per cent. (debentures) 5, Henry Briggs and Company (A) 3⅜, ditto (B) 4⅛, John Brown and Company 5 per cent. (pref.) 5, Muntz's Metal, 9, Parkgate 5⅛, Staveley (A) 5⅜, ditto (B) 6, ditto (C) or (D) 4⅞, and ditto 5 per cent. (pref) 4⅛. In oil companies, Dalmeny would yield 5, Oakbank 10, ditto (new) 9½, Price's Patent Candles 7¾, Uphall 5⅛, and Young's Paraffin 7⅜. In wagon companies, Birmingham would yield 7¾, British 9, Metropolitan 7¾, North Central 8, Scottish 5⅜, ditto (new) 6⅛, Sheffield 6⅛, and Yorkshire (A) 5. Great Laxey Mine would yield 8, St. John Del Rey 10½, Tharsis 6½, and ditto (new) 6½. Among miscellaneous investments may be mentioned, Earle's Shipbuilding to yield 11, Milner's Safe 8⅔, Phospho-Guano 3, and Val de Travers Paving 7½.

Capital. Per share.	Capital. Paid up.	Dividends. Rate per cent. per annum. Previous.	Dividends. Rate per cent. per annum. Last.	Description of shares.	Last price.
				COAL, IRON, STEEL.	
£10	£8	£5	£5†	Arniston Coal (Limited)	6
10	10	4	nil	Benhar Coal (Limited)	22s.
100	60	25s.‖	25s‖	Bolckow, Vaughan, and Co. (Lim.)—A.	53
10	10	10	10	Cairntable Gas Coal (Limited)	6⅛
10	10	4s‖ April, 1876		Chillington Iron (Limited)	41s. 3d.
10	10	—	—	Clyde Coal (Limited)	26s.
20	20	10s‖ Dec., 1874		Ebbw Vale Steel, Iron, and Coal (Lim.)	35s.
10	8	nil	nil	Fife Coal (Limited)	75s.
10	10	nil	nil	Glas. Port Washington Iron & Coal (L) B.	45s.
10	10	—	—	Ditto, A.	45s.
10	10	—	—	Lochore and Capledrae (Limited)	15s.
10	10	nil	nil	Marbella Iron Ore (Limited)	25s.
10	10	nil	nil	Monkland Iron and Coal (Limited)	39s.
10	10	nil	nil	Ditto Guaranteed Preference	47s. 6d.
100	100	nil	nil	Nant-y-Glo & Blaina Ironworks pref. (L)	15½
6	6	nil	nil	Omoa & Cleland Iron & Coal (L. & Red.)	8s. 6d.
1	1	15	15	Scottish Australian Mining (Lim)	37s. 6d.
1	10s.	15	15	Ditto New	17s. 6d.
Stock	100	nil	nil	Shotts Iron	40
				COPPER, SULPHUR, TIN.	
4	4	—	—	Canadian Copper and Sulphur (Lim.)	7s.
10	7	72s 6d‖	60s‖*	Cape Copper (Limited)	27½
1	1	nil	nil	Glasgow Caradon Copper Mining (Lim.)	19s. 6d.
1	15s.	nil	nil	Ditto New	11s. 6d.
10	9¾	nil	nil	Huntington Copper and Sulphur (L.)	19s.
4	4	—	—	Panulcilo Copper (Limited)	20s.
10	10	nil	nil	Rio Tinto (Limited)	80s.
20	20	7	7	Ditto, 7 per cent. Mortgage Bonds	15/15s9d
100	100	5	5	Do. 5 p.ct. Mor. Deb. (5p.Con. Bds.)	70¾
10	10	17½	16½‖	Tharsis Copper and Sulphur (Lim.)	21/11s3d
10	7	17½	16½‖	Ditto New	14⅝
1	1	—	—	Yorke Peninsula Mining (Limited)	3s. 9d.
1	1	—	—	Ditto, 15 per cent. Guaranteed Pref.	10s.
				GOLD, SILVER.	
1	1	—	—	Australasian Mines Investment (Lim.)	3s.
5	5	10s.‖	10s.‖	Richmond Mining (Limited)	8⅛
				OIL.	
10	8½	—	9	Broxburn Oil (Limited)	12½
10	7	5	5	Dalmeny Oil (Limited)	7
1	1	15	20	Oakbank Oil (Limited)	40s.
1	5s.	15	20	Ditto	10s. 6d.
10	10	2	4	Uphall Mineral Oil (Limited) "A"	5¾
10	10	—	—	Ditto "B" Deferred	10
10	8½	17½	12½	Young's Paraffin Light & Mineral Oil (L)	13¾
				MISCELLANEOUS.	
50	25	5	6	London & Glasgow Engineering & Iron Shipbuilding (Limited)	15½
7	7	5	nil	Phospho Guano (Limited)	5½
10	10	5	5	Scottish Wagon (Limited)	9½
10	4	5	5	Ditto New	58s.

† Interim. Per share. * For 1878. ‖ For 14 months.

NOTE.—The above lists of mines and auxiliary associations are as full as can be ascertained, Scotch companies only being inserted, or those in which Scotch investors are interested. In the event of any being omitted, and parties desiring a quotation for them, and such information as can be ascertained from time to time to be inserted in these lists, they will be good enough to communicate the name of the company, with any other particulars as full as possible.

J. GRANT MACLEAN, Stock and Share Broker.

Post Office Buildings, Stirling, Aug. 7.

MINING IN CORK.

Mining enterprise in Ireland, especially in Cork, has for some years back shared the depression which resulted from an unfortunate political excitement, although there is no district in the kingdom which has produced so much mineral with such a limited scale of operations; the extraordinary copper vein at Colleras, in West Cork, was closed (just as its immense wealth was being developed) by the independent action of the proprietor, Mr. Isaac Deane Notter, who would not stoop to absurd demands on his purse or domain. An old and valuable property on the same vein or lode, but eastward at Schull (a corruption of School) Harbour, in the township of Gosheen, is about being re-opened by the accomplished veteran and, of course, experienced mining engineer and mineralogist, Capt. William Thomas, M.E., and C.E., of St. Just, Cornwall.*

This property was well-known to the father of Mr. S. C. Hall, F.R.S., the eminent author and biographer of Tommy Moore; and Sir Robert Kane made special mention of it in his "Industrial Resources of Ireland." But in addition to the injury received by the patriotic (?) attempts of some to improve the prosperity of their country, a great blow was given by the publication of geological maps, in which the district was coloured as if composed of sandstone, in which it would be useless to look for the carbonates of copper, sulphates of iron, baryta, or other valuable mineral. If this colouring had been accompanied by a note or explanation of the fact that the geologists had an idea that the slate was an outcrop of the sandstone, or that they failed to ascertain the exact nature of the carboniferous series of slates and killas (or grauwacke, as the Germans call it), and that roofing or clay-slate largely abounded in the district, so much injury might not have resulted, and the colouring would have been taken as the result of a mere vexed question or argument over a technical glass of gin-hot in some friendly tap in the Strand, or perhaps Jermyn-street.

But when we consider that neither the elvans, granites, diorites, or porphyries of the district are shown, we must say that great and undeserved injury is done to the locality by these maps, which are largely and eagerly consulted by promoters and speculators in London. We would be sorry to hint that this erroneous colouring were other than the fault of overstrained theory. A friend said to the writer, when remonstrating on the subject—"Oh, you want petrology, and not geology." We said—"We want whatever will show best the resources of the neighbourhood; a working man would not call the Yorkshire flags under Schull Church slates; but that is not the only part of the map you have not coloured as sandstone; the diorite of Schull is a better paving stone for Cork or Dublin than the diorite of Wales, but you show no indication of its being there in such valuable quantities."

The speculators of London, and the wealthy men of England, are not without good practical advisers; these men know where to look for the likely places where valuable mineral deposits occur; but if they miss from the Government maps the indication which would exist of greenstone protrusions, elvans, porphyries, &c., were mineral to be had, who can blame them if they prefer to advise the seeking in some distant land the dividends denied them at home?

Statements have been volunteered that the copper was merely a surface deposit, washed down from, perhaps, the clouds; it would be difficult to say where else. The only portion of the West of Cork that got fair play was Allihies, better known as the Berehaven Mines (although many miles from Berehaven); the copper there was most inferior yellow carbonate, but the quantity found balanced the quality. In Cosheen, on the contrary, the green carbonate, popularly known as malachite, has been got in cartloads, and the writer has some most exquisite specimens auriferous and superior to the ore of Siberia.

At Colleras, outside the town of Goleen, there are no surface indications; the ore is to be seen pure and simple in blocks in a tunnel or natural adit or cave running in from the sea at a great depth at low water, and, in fact, all through West Cork, like the coal mines of Ballycastle in Antrim; the correct way to attempt mining operations is by adits, and deep sinking is certain to be ultimately productive.

Mr. Warington W. Smyth, F.R.S., &c., writing some years since on the mines at Allihies, in his most valuable notes described the rocks as slaty rocks, the killas of the miners, and interstratified massive beds; dark blue varieties of clay slate, with gray and blue kinds of same, a mass of slaty and grit rocks; but nowhere does he describe them as Old Red Sandstone, and as a practical man and authority his opinion was far before the tyros of the Geological Survey of that date, however they may have improved since, or whatever hints they may have had from head quarters.

Every miner knows that Old Red Sandstone is generally a rock barren in mineral ores, and hence the injury done to the character

* Our esteemed correspondent Mr. William Thomas, is not from St. Just. Camborne is his native place; but he acquired his practical knowledge of mining in Dolcoath, and his family have been for generations connected with that celebrated old mine.

of Cork as a mining country by the publication of geological maps coloured to show the existence of that rock. We were most disappointed when about to build extensively in West Cork, in 1862, to find that there was little or no red sandstone practically in a district coloured for miles as such theoretically. However, the company, in again placing their property at Schull Harbour in the hands of Captain Thomas, have exhibited not only a confidence in his well-known skill, but a proper contempt for the puerile efforts of a Government to damage one portion of a kingdom for the advantage of another. Mr. John Kelly, F.G.S., writing in the Atlantis in January, 1859, makes this pithy remark, speaking of the geological colouring of the Government Survey:—"There is a long narrow district of Old Red Sandstone shown on the map. . . . . Two of the highest hills in the south of Cork are situated in it, that is Carrickfadda and Mount Gabriel. The geologist who goes up Carrickfadda hill to see this old red sandstone will be surprised to find none there. The rocks are all grey, hard, thick-bedded grit, with a few bands of grey clay-slate;" and, were evidence wanting of this stupid attempt to do an injury to poor Ireland, an immense mass could be forthcoming, but it is not requisite. The gentleman whose name we have mentioned as being employed by the company is above all mere sapper and miner influence; his experience at the Condurrow and Wheal Grenville Mines of Cornwall, in many parts of England and Wales and the Isle of Man, and as a consulting mining authority in every part of Ireland, places the matter beyond the mere accidents of official flunkeyism.—*Irish Builder.* J. S. S.

THE ATMOSPHERIC SYSTEM OF RAISING MINERALS, FOR THE WORKING OF MINES OF ALL DEPTHS.*

To obviate the difficulties that are met with in raising the mineral and maintaining a sufficient ventilation in the workings of deep mines, a radically new mode of lifting has been introduced in the Hottinguer shaft of the Epinac collieries (Saône et Loire). This shaft now exceeds 600 metres (656 yards) in depth, and will be sunk to 1000 metres (1093·6 yards).

The coal trams, to the number of nine, are placed one above the other in a cage, which is provided at each end with a piston, working in a large tube reaching the whole depth of the shaft. The cage is raised or lowered by creating a partial vacuum or a plenum above the piston by means of a powerful air-pump. The arrangement consists of either a single tube, in which a cage alternately rises and descends, or of two tubes, coupled together, in one of which a train of empty trams descends while a full tram is being raised in the other. When two tubes are used the air pumped from that in which the full train is being lifted is delivered into the other, in which the empty train is descending, and in which there is already a partial vacuum, instead of into the atmosphere, and the weights of the trains thus balance each other, the net load of coal only having to be raised by the engine.

The air of the mine, which fills the lower part of the tube as the train rises, is blown out to the surface through an escape pipe as it descends, and the ventilation is thus to some extent assisted.

The powerful exhausting engine employed may also be made useful in fiery mines, by closing all openings when the workmen are absent, and producing a partial vacuum in the workings. The fire-damp may thus be drawn out from the strata near to the passages of the mine, just as it is, but more thoroughly than when a natural fall occurs in the pressure of the atmosphere; and it may then be blown out, and the mine filled with pure air, before work is recommenced.

The tube used in the Hottinguer shaft is single, 5 ft. 3 in. in diameter, of wrought-iron, about 5-16 in. thick. It is in lengths of 4 ft. 3 in., bolted together, the joints being made with rings of caoutchouc ¼ in. thick. The heads of the rivets are countersunk on the inner side.

The sections of the tube carrying the doors and other fittings are in cast-iron. At each loading and discharging place, or station, there are three doors in the tube, one above the other, spaced the height of three trams apart; so that when the cage is in one position the first, fourth, and seventh trams are opposite to the doors; when it is lowered through the height of a tram, the second, fifth, and eighth come opposite to the doors, and so on.

The cage is retained in any position by stops worked from the outside, and is readily lowered or raised at the stations, to bring any trams opposite to the doors, by admitting air over it, or by opening a communication between the tube above it and the exhausting engine. The cage is stopped, without shock, at the ends of its travel by the cushion of air in the closed ends of the tube; and to admit of stopping at intermediate levels, as well as to guard against accidents, a sliding partition is fitted in the tube immediately below each station, except that at the bottom, which is open so long as the cage is below, but is closed when it has passed. The position of the cage, with its pistons, during the ascent or descent, is indicated in the engine-house by a series of barometers showing the pressure of air in the tube at points 100 metres (109 yards) apart. As the pressure below the cage is equal to that of the atmosphere, while a partial vacuum is maintained above it, the barometers show at once whether the cage is above or below the point at which each of them is connected to the tube.

To allow the pistons attached to the cage to fit the tube, even where this is not cylindrical, as at the doors, one of them, that above it, is made double, consisting of two pistons spaced at a distance apart greater than the height of a door, but less than the length of tube between two doors. The pistons are packed with leather, and the tube is lubricated with water mixed with a little soap and oil.

The weight of the tube, 603·30 metres (659 yards) high, now in use, is 345 tons. It was completed in July 1876, and has been worked regularly ever since. It is served, provisionally, by two pumping cylinders, 5 ft. 3 in. in diameter by 2 ft. stroke, driven by gearing from the winding engine formerly in use. With this pumping power, the trains lifted are each of 6 tons gross weight, carrying 3 tons of coal. The vacuum maintained in the tube is equal to a column of 9·4 to 9·8 in. of mercury; the speed of the train is 19½ in. per second; the friction is scarcely perceptible; and the leakage of air past the pistons does not exceed 14 to 17 cubic feet per second.

The work done in lifting the coal is 28 per cent. of the indicated power of the engine, while with the same engine, when winding up by a rope, it did not exceed 16 per cent.

Larger engines, of 730 horse-power, are being constructed to work the tube, and with these a train of a gross weight of 9½ tons, carrying 4½ tons of coal, will be brought up at each lift. It is estimated that the consumption of coal for the boilers of the winding engines, in lifting from a depth of 1000 metres (1093·6 yards), would be 10 per cent. of the quantity raised if ropes were used, but will be only 3 per cent. by the pneumatic system, even with a single tube. This is a saving of 154 lbs. of coal per ton of coal lifted, equal to 6·6d. per ton, valuing the coal used for the boilers at 8s. per ton. With an output of 450 tons per day, and reckoning 280 working days in the year, this is equal to an economy of 3528*l.* per year, in boiler coal alone. A full description is given of the engines being constructed for the service of the tube, and the details of the system are illustrated by five plates.

— By Z. Blanchet: Annales des Mines.

Burnt Ore.—Upwards of 400,000 tons of burnt ore are extracted annually in the United Kingdom, and for this quantity some 50,000 to 60,000 tons of common salt are consumed.

Chemicals, Minerals, and Metals.—Messrs. J. Berger Spence & Co. (Aug. 2)—Alum: Loose lump, 6*l.* 2s. 6d. to 6*l.* 5s.; ground, 6*l.* 15s.—Arsenic: Best white powdered, 10*l.* 15s.—Borax: Refined English, 36*l.*—Copperas: Green, 50s. 0d.; white, 8*l.* 15s.—Copper: Sulphate, 18*l.* 8s. to 18*l.* 10s.—Nitrate of Lead: 30*l.* 0s.—Saltpetre: Refined English, 23*l.* 15s. to 25*l.*—Sulphate of Zinc, 9*l.* 0s. 0d.—Sulphur: Roll, 8*l.* 10s.; flowers, 10*l.* 10s.—Tin crystals, 5¾d. per lb.—White Lead, 20*l.*—Barytes: Carbonate, 5*l.*—Brimstone: Best thirds, 5*l.* 2s. 6d.—China-Clay, 38s.—Oxide of Zinc, 17*l.* 10s.—Talc, 5*l.*—Umber, 70s.—Charcoal: Best stick, 4¾d. per bushel; field burnt, 6d.—Globe Steam-Boiler Powder, 16s. per cwt.—Naphtha: Miscible, 60 per cent., 4s. 9d.

* From James Forrest's "Abstracts of Papers in Foreign Transactions and Periodicals," for the Proceedings of the Institution of Civil Engineers.

Meetings of Public Companies.

PATELEY BRIDGE MINING COMPANY.

The statutory meeting of shareholders was held at the offices of the company, Austinfriars, on Thursday,

Mr. William Baxter in the chair.

Mr. W. J. Lavington (the secretary) read the notice convening the meeting.

The Chairman said the Legislature in its wisdom had provided that all companies should call a meeting of their shareholders within four months of the date of registration. What special benefits they supposed accrued to shareholders by this provision he did not know, nor was it for them to enquire. It was sufficient to say the shareholders had been called together in conformity with the Act. There was no business of a special character to lay before the shareholders, but they would naturally expect that, having been called together, he should give them a short statement of their position and prospects. He should, perhaps, first of all mention and express their thanks to the shareholders for the unanimity with which they had acceded to the proposals of the directors with regard to the reconstruction of the company, proposals which they thought would be the best that could be carried out in the general interests of the shareholders, and that opinion had been confirmed by subsequent events. He was very glad to be able to tell them that nearly the whole of the shareholders had fallen into the scheme—in fact, at the present time there were only 34 shares of the old company, out of 3000, still outstanding. (Applause.) He should, perhaps, tell the shareholders that since the reconstruction of the company he had been down to the mines, and had been both over and under ground with Captain Williams, and he had been very much pleased with everything that had been done, and with the prospects of the mine. With regard to the new machinery, which had, as most works of this nature did, cost them a little more both in time and money than was anticipated—but he need hardly tell them that was not an unusual thing—when he saw what had been done, and the way in which this heavy machinery had been got through a horse level ½ mile in length, and put into a proper position, he thought very great credit was due to the agent and to all who had assisted in its erection. He believed the work was of the best kind they could obtain, and that the pumps now in use were sufficient to keep the mines drained for years to come; in fact, Cameron's foreman told his (the Chairman's) friend—Mr. Hutchinson—that there was not work enough to do with the machinery, but he supposed there would be more work for it hereafter. (Hear, hear.) The erection of the machinery occupied a longer period than had been anticipated, and the sinking was not resumed until the beginning of July, since which time very good progress had been made. The lode going under the 30 fm. level fully maintained its value, and it was at the present time one of the best lodes in the kingdom. Thinking it would be satisfactory to the shareholders generally that Captain Williams's reports should come before them from time to time with some confirmation, the directors had appointed Mr. Hutchinson as a director of the company. He had considerable experience in mining, and had acted as agent for the mine two or three years before it was handed over to this company, and he also represented his father and another gentleman in a mine in the neighbourhood. It was thought that it would be satisfactory if Capt. Williams's reports were to be confirmed from time to time by the independent testimony of Mr. Hutchinson. This had been arranged, and Capt. Williams would on all matters of importance confer with Mr. Hutchinson, who would also see that all the accounts were properly examined and passed—and, in fact, render any assistance to Capt. Williams and the directors that he possibly could in the interests of the company. Having done this he wrote to Mr. Hutchinson and asked him if he would, preparatory to this meeting, visit the mines and send a report to be laid before the shareholders. He also wrote to Capt. Williams asking him to send his report. Mr. Hutchinson went over the mine on Monday last with Capt. Williams, and it was arranged that they should compare notes at Mr. Hutchinson's house. The weather, however, prevented Capt. Williams from keeping the engagement, and it would add some what to the value of these reports to know that they had been made without any reference one to the other. Mr. Hutchinson, sen., told the directors that when his son returned from the mine he expressed his astonishment at the present position of the mine, especially with regard to the lode which they were now developing below the 20 fm. level.

Mr. Lavington then read the following reports:—

Aug. 6.—I beg to forward you the following report of work done since the general meeting held in December last, and of the present position and future prospects of the mine:—Underground we have excavated in hard limestone 13 cubic fathoms of ground for engine-room, in which we have erected two of Cameron's 8-in. double-ram steam stamps, fixed in the engine-shaft, 200 ft. of 8-in. steam-pipes, and 200 ft. of 6-in. water-pipes. We have also erected one of Fowler's multitubular boilers, and covered the same and steam-pipes with non-conducting composition, and have re-arranged the old pitwork, consisting of 20 fathoms of 12-in. plunger-lift and 10 fathoms of 12-in. drawing-lift, repaired old engine and boiler, and attached the same to a line of wire-rope 390 feet in length, constructed and erected a new T-bob and headgear over engine-sump or sump-winze, made and fixed new pulley-stands for carrying wire-rope for pumping from new sump, cut foundation for bob, erected wood frame for the same, enlarged the 30 fm. level for tram-sidings and pulley stands, cut stand over the engine-sump, fixed pitwork in same, &c. All this work has been accomplished in two months, and when it is considered that all the machinery had to be taken into the mine through a level half-a-mile in length, measuring in place only 5 ft. 6 in. by 3 ft. 6 in. I think the progress made cannot but meet with general approval, and I am glad to say all are working admirably, and giving entire satisfaction. The engine-sump, on Rake vein, under the 30 east, is in regular course of sinking, by 12 men, now down 8 fms. 2 ft. 6 in.; the vein in the bottom is from 7 to 8 ft. wide, 2 ft. of which is nearly solid ore, the remaining portion containing more or less ore, and worth for size of shaft (10 ft. by 8 ft.) 10 tons per fathom. At this point the ground is becoming very compact, with an increased quantity of water, but I hope to be down to the 40 in the course of this month, when we shall at once cut plat and strike out levels on the ore course both east and west. The 30 east, on Rake vein, is being driven by four men; the lode in the present end is regular and well defined, being from 5 to 6 ft. in width, consisting of fine matrix, and a leader of ore on the south wall, producing good saving work for dressing; I consider that our prospects at this point are very favourable, and a single stroke of the pick might at any time develope a good body of ore. In the 30 north-west we are still cross cutting by four men to reach the north part of Fielding's vein; and, according to my diallings, we have about 8 ft. more to drive to intersect the ore ground as seen in the workings above. My object in this is to lay open ground for tributers, and when done we shall be able to set several pitches at a good advantage to the company. We have already let one tribute pitch in the back of this level, to four men, at 5*l.* 12s. 6d. per ton for dressed ore, worth 15 cwts. of lead ore per fathom; ground hard. The tribute pitch in back of the 30 east is worth 10 cwts. of lead ore per fathom; working by four men, at 5*l.* 12s. 6d. per ton for dressed ore. The tribute pitch in Fielding's vein, in the 20 north-west, is worth 15 cwts. of lead ore per fathom; working by four men, at 5*l.* 12s. 6d. per ton for dressed ore. The tribute pitch in Fielding's, in the sump under the 20 north-west, is worth 1 ton of lead ore per fathom; working by four men, at 5*l.* 12s. 6d. per ton for dressed ore. The tribute pitch in Lumb vein, in the 20 west, having become poor I have set the men to cross-cut at another point to ascertain its value, and I have every confidence that we shall meet with some good ore again. I would strongly recommend to resume the driving of the 20 east, on Rake vein, being in my opinion one of the best points in the mine, as by driving the 30 only we might escape several rich deposits of ore between the two points. The produce for July amounts to 40 tons 14 cwts. of lead ore, which will yield 30 tons of pig lead. I shall continue to do my utmost in the future as I have done in the past to further the interests of the company.—C. Williams.

Aug. 5.—According to your request, I yesterday went through your mines with the agent, Capt. Williams, after inspecting the new machinery at the top of the engine-shaft, we visited the forebreast of the 30 east. I here found an exceedingly strong and masterly vein, easy to work, and letting out a strong feeder of water; it did not, however, appear, to contain any regular leader of lead, but had small ore, and occasional solid lumps, interspersed throughout. This I consider a most important point, as this level is now extended further east than either the 10 or the 20, consequently there would be considerably over 30 fms. of whole ground above the level on reaching the next deposit of ore, and I see no reason for doubting that such should exist, as its being a north and south vein other veins and strings must intersect it, and it is at these points that the vein has always proved itself so productive. The first sump below the 30 east contains the 6-in. lift of pumps, which were working most satisfactorily; it is being sunk in a splendid lode that has scarcely varied, as far as I could learn, since the first couple of fathoms were sunk. The vein in the bottom and in both ends is fully 1 yard wide, 2 ft. being almost solid lumps of lead, the remaining 12 in. consisting of spar intermixed with ore. A second sump is now being sunk a few fathoms further east, and is down about 6 fms.; it contains ore of the same quality, and in about equal quantities. It is intended after sinking a few fathoms deeper to communicate with No. 1 sump in order to establish a thorough current of air. In the 30 west a cross-cut is being driven to intersect Fielding's vein and strings, which are now being worked on tribute from the 20 fathom level; the ground here is generally harder and the bearing part straighter than in the Rake vein itself, but the yield per fathom is fairly regular, and very suitable for tribute pitches; if better prices were only obtainable for lead a greater number of men might be employed in this way throughout the mine, and thus the returns of ore increased. I was much pleased with the manner in which the new steam-pumps performed their duties; they work smoothly and almost noiselessly, pouring out a continuous stream of water with apparently no exertion whatever. Great credit is, I am sure, due to Capt. Williams, when it is considered that the whole of the new machinery has been successfully erected, some at a depth of nearly 500 ft. below the surface, without sustaining any injury or causing accident either to the workmen or material. It is very desirable, if it be possible, that operations should recommence in the eastern portion of your property, as this in former times, although heavily watered, used to be the richest and most profitable part of the mine, it is now entirely drained for 60 fms. below the old adit by the Eagle level. The present price of lead presses heavily on all mines producing that metal, but as the general trade of the country improves it will doubtless return to its former position; even now a better feeling is apparent, and the market firmer at a slight advance.—Hilton Hutchinson.

The Chairman then said there were one or two points to which he might refer. Mr. Hutchinson remarked upon a point which Capt. Williams had pressed upon them for some time—that was with regard to the eastern portion of the ground, of which, from what they knew of it, they entertained a very high opinion as to its value, but they considered that the time had not yet arrived when they could ask the shareholders to work it. They thought that if they obtained the success which it was believed they were on the eve of achieving there would be no difficulty hereafter in developing that part of the property, as in the reconstruction scheme they had reserved 7500 shares for that purpose. The directors would watch the matter very closely, and whenever the time arrives they would not fail to ask the shareholders to assist them in raising the capital. With regard to the yield, they would have seen that Captain Williams had got 40 tons of lead ore during the month of July. He might mention that when he was at the mine he asked Captain Williams to tell him definitely what they might rely upon for the then ensuing two or three months, as on that would depend their future financial arrangements. He asked for the lowest estimate that could absolutely be relied upon, and Capt. Williams promised that for July and August he would return 30 tons of pig lead each month, and the shareholders would see that this promise had quite been kept with regard to July; and that, assuming the lode to keep something like its present value, the yield would not be less than 60 tons, which would be augmented by anything that might develope itself. The eastern portion of the property was, as would have been gathered from both reports, looking very favourable for another development, but whether they got it or not would depend on circumstances over which they had no control. He should mention also that Mr. Hutchinson, sen., and the other lords had met them fairly with a reduction of the royalties during the present low price of lead. Mr. Hutchinson was rather of opinion—as most other gentlemen connected with the lead trade were—that at present there was a decidedly better feeling with regard to lead, and it was hoped that this would increase. He need not tell them that a rise of a couple of pounds per ton would make a great difference to them. They were now paying costs, and a rise of 2*l.* per ton on a return of 50 tons a month would make a difference of 100*l.* a month. When the reconstruction took place, as they were aware, a call of half-a-crown per share was made. The directors were then, as they were now, anxious to limit the calls upon the shareholders as much as possible; but the liabilities taken over from the old company had to be met, and the extra time taken up in the erection of the new machinery prevented them developing the mine, and they were working for some time with increased expenses without getting any returns. They believed that the corner had now been turned, and that the mines would soon be worked at a profit. The liabilities of the company amounted to 1440*l.*, against which they had the uncalled capital amounting to 3581*l.*; and they had also 289*l.* in the bank, and 116*l.* represented the arrears of calls, making together 415*l.* The directors would have to make a call of 2s. per share, which would entirely clear off the liabilities, and leave 40*l.* available; and it was thought that they would go on steadily making profits, and that by the date of the next meeting they would be able to meet under much more favourable circumstances than they had ever done. He would be very happy to answer any question which any of the shareholders might wish to put.

A Shareholder asked if the company was paying its way at the present time?

The Chairman said it was, even with the present low price of lead. Capt. Williams was now simply getting ore from the sinking of the shaft, but within a fortnight or three weeks it might be hoped that he would begin the drivings east and west upon the lode, which would of course very much increase the output. When he (the Chairman) was on the mines Capt. Williams told him that for over 60 fms. in the 30 fm. level he had this lode in the sole of the level, and he had put various trial pits along the 60 fms., and had in every case found the lode going down. At the present time it was worth 10 tons per fathom, and if it went down anything like that he need not tell them that they would be able to make very large returns.

A Shareholder asked what had become of the lead that was lying on the mine at the time of the re-construction?

The Chairman replied that it was sold in the month of July to meet the June pay. There had lately been a change in the formation of the lode, which in the opinion of those well versed in the matter gave evidence of a very good deposit being found within a short distance. A specimen of the lode had been submitted to an eminent metallurgist and mineralogist who had never heard of the mine, and he said "That looks as though you were on the outcrop of a very large body of ore." This specimen was taken from the 35 fm. level, not more than 50 yards from the boundary.

The meeting then closed with a vote of thanks to the Chairman and directors.

SOUTH CARADON MINING COMPANY.

At a general meeting of shareholders, held at the mine, on Tuesday (Mr. Richard Hawke in the chair), the accounts for third, fourth, and fifth months were allowed and passed, and the balance of 2658*l.* 9s. 11d. carried to the credit of next account. The following report was presented:—

Aug. 5.—I am pleased to say the mine is still looking well, enabling us to return large quantities of rich copper ores; and had we anything like an ordinary price for it, instead of paying no dividend to-day, we should have been in the position to declare a very good one.—John Holman.

WEST WHEAL PEEVOR MINE.

A general meeting of shareholders was held at Philpot-lane, City, on Thursday,—Sir John Hayes, Bart., in the chair.

Mr. Thomas Pryor (the purser) read the notice convening the meeting and the accounts, which showed that the labour costs from Nov. 23 to Aug. 2 amounted to 768*l.* 10s. 8d., and the bills to July to 917*l.* 15s. 7d.: total, 1686*l.* 6s. 3d. On the credit side it was shown that the credit balance on Nov. 7 was 23*l.* 11s. 8d.; the call made on 3000 shares, at 10s. per share, realised 1500*l.*; tinstuff sold, 18*l.* 9d., less lords' dues at 1-20th, 18s. 5d., 17*l.* 10s. 7d.; showing a loss of 145*l.* 4s. Mr. Pryor then read the agent's report, as follows:—

August 7.—I beg to submit the following as my report of the mine:—Since the last meeting Michell's engine-shaft has been sunk to the 10 fm. level, and a cross cut driven 7 fms. to intersect the lode. At the point of intersection the lode was very productive, producing stuff of fully 6 per cent. of tin. We have now driven on its course east 2½ fms., and west 4½ fms. The most important end is the western one, having very near the entire length of the sett to extend into. The lode in this end is of a very promising character, and will pay for driving. The most productive part of the lode is about 18 in. wide, and the remaining portion is composed of priany branches, and carrying tin. As we are extending west these branches are continually dropping in from the north with the part of the lode we are now carrying. Knowing this to be characteristic of this lode, which is the same as we are working on at Wheal Peevor, I feel certain there is still more lode standing to the north. In order to ascertain this we have set a pare of men to cross-cut in that direction to prove it. During the last fortnight we have commenced to prospect on the back of the lode about 70 fms. to the west of our present workings. We have not as yet gone beyond the shelf, or top of the rock, but I consider we are in the right direction for the lode, the ground as far as we are gone being strongly mineralised and full of branches containing tin. This evidently shows the existence of a strong and productive lode underneath. Michell's engine-shaft is now down 2½ fms. below the 10 fm. level, being four weeks work. With this speed of sinking we shall reach the 20 at the time specified—Nov. 1 next, and intersect the lode at this depth about two months after. I have not the slightest doubt on my mind (judging from the nature of the ground) but that we shall meet with a very productive lode at this point, as we shall then be down into more settled ground, being 35 fms. from the surface, or equal to about 50 fms. in Wheal Peevor. At this level we intend cross-cutting south also to intersect the 5 ft. lode, which is an important feature in the mine. We have also purchased since the last meeting a very good 50-in. cylinder pumping-engine and a suitable boiler, which is all delivered on the mine and charged in the present accounts; also a portable engine, which is at present used for pumping, and which will, as soon as our large engine is at work, be used for winding. Looking at the position of this mine and its immediate relationship to Wheal Peevor, where a course of tin for over 100 fms. in length has been opened up, I have no hesitation in saying that I can with confidence recommend it as a first-class investment.—W. T. White.

He (Mr. Pryor) added that the labour costs had been charged up to Aug. 2—Saturday last—which was as close as they could possibly be charged, and the bills and every liability had also been charged up to the latest date possible. Since the last meeting, as Capt. White mentioned in his report, a powerful pumping engine, a winding engine, and pitwork had been purchased and paid for, except the 145*l.* shown in the accounts. Captain White was present, and would be happy to answer any questions with regard to the mines, and if any explanation were required in respect to the accounts he (Mr. Pryor) would be very happy to give it.

Capt. White drew attention to a piece of very porous gossan which had been raised from the prospecting pitch about 70 fathoms west of the present workings. This was cut on Tuesday afternoon, at a depth of about 6 ft. from surface. It was of a very kindly appearance, and indicated a good run of tin, and he believed that within a certain depth they would find something very good there. With regard to the present workings in the engine-shaft, anyone to know the future of West Peevor must see Wheal Peevor. The lode in their property at the nearest point to West Peevor was valued at 40*l.* per fathom. The lode was going through the heart of both setts, and he thought that spoke well for the future of West Peevor. He believed all the statements he had made with regard to the mine would prove correct, as they had in Wheal Peevor.

Capt. Rich (of South Condurrow) asked how far the shaft was being sunk from the boundary?——Capt. White replied about 20 fathoms, and that was why he referred in his report to the western end. On the other side of the shaft they had a great length of ground.

Mr. F. Michell did not think there could be any question as to the value of the property, and said it was only a question of time to develope it properly, so as to produce good results.

The Purser expressed his pleasure at seeing Capt. Rich present at the meeting as a shareholder in the mine. They all knew the success which he had had at South Condurrow, and that Capt. Rich was a great authority on mining matters.

Capt. Rich said it was very important that their lode was worth 40*l.* per fm. within 20 fms. of the boundary.——Capt. White added that the tinstuff sold since Midsummer day had been raised from the sinking of the shaft, and he believed, looking at the branches in the 10 fm. level, that they would have a far more productive lode in the 20 fm. level than they had in the 10. West Peevor was rather lower than Wheal Peevor, the 35 fathoms in the one being equal to about 50 fms. in the other. They had 80 fms. above this level, and with respect to that he might say that they were now rising within about 6 ft. of the 36 for the purpose of ventilation, and in that rise they had a lode fully 7 ft. wide, and worth as much as the end was.

Capt. Rich asked how near the lode was to the end?——Capt. White replied about 3 fms.; and, in reply to an observation, he added that he believed the costs would be very small, and judging from the present appearances he believed that results in West Peevor would be in excess of what the public believed.

Mr. Thompson observed that they would want some good plant, which would make the costs heavier.

Captain White said that for the present they would sell the tin in stone. He believed they would intersect the lode in the 20 by about Christmas, and if the lode were as rich as he hoped it would be they would be able to raise a large quantity of stuff.

The Purser said they had fully 400 fathoms to the west of the shaft, and the shaft was 20 fathoms from the Wheal Peevor boundary.

The Chairman said he thought they must all be very much pleased with Capt. White's report. Everything seemed to be going on most satisfactorily, and it was especially encouraging to know that they had the same sort of ground that Wheal Peevor itself had He proposed "That the accounts as printed, showing a balance of 145*l.* 4s. against the mine, be allowed and passed, and, together with the agents' report, be printed and circulated amongst the subscribers."——Mr. Thomas Hills seconded the motion, which was carried unanimously.

The Purser said that, with regard to ways and means, a call of 5s. per share would give them 750*l.*, which would pay off the debit balance, and probably carry them on for six months, by which time he hoped they would have a better statement to lay before the shareholders.

On the motion of Mr. THOMPSON, seconded by Mr. HERITAGE, a call of 5s. pe share was made.

A motion was also passed transferring the banking account, which was kept at the Cornish Bank until its suspension, to the Cornish Bank (Limited).

The CHAIRMAN asked what length the lease was?——The PURSER said it was for 21 years, of which nearly 20 years remained to run.

Capt. RICH said he would not have put his money into the mine if he had not confidence in its future success, and if he thought things were not going as well as they ought he would certainly say so. Notwithstanding the depression and the foreign supplies Cornwall had, though not without some severe struggles, held its own, and had lately increased the returns somewhat, while the Australian shipments showed a decrease. West Peevor seemed a healthy child, and he hoped it would have a vigorous manhood, with a little help. It certainly had a good nursing father in Mr. Pryor. (Laughter, and hear, hear.)

A cordial vote of thanks was passed to Mr. Pryor, Mr. Michell, and to Captain White, and, with a like compliment to the Chairman, the meeting terminated.

SOUTH CONDURROW MINING COMPANY.

A general meeting of adventurers was held at the offices of the company, Austinfriars, on Wednesday (Mr. H. J. MARSHALL in the chair), for the purpose of passing the accounts, and the general business of the mine. The statement of accounts for the sixteen weeks, ended July 5, showed a profit of 3054*l.* 13s. 1d.

Capt. RICH read the following report:—

July 5.—In presenting you with a report of the operations in this mine since your last general meeting we have to remark that in addition to the exploratory and other ordinary work underground we have carried on a great deal of extraordinary surface works, and have added considerably to the tin dressing plant, besides fixing a new and great length of launders to convey the water from the pumping-engine to the reservoir; this was highly necessary, as a full supply of water is most essential in a tin mine. We have also a set of men clearing the adit level since the early part of January, and although this work is not yet completed we hope to derive great benefit from it in the coming winter. The lode in the rise in the back of the 30, east of engine-shaft, is worth 7*l.* per fathom. The 40 end, east of the said shaft, is worth 8*l.* per fathom, and the lode looks likely to improve. The rise in the back of this level is worth 10*l.* per fathom. The 50 end, east of King's, is worth 9*l.* per fathom. The lode in the back of this level is worth 12*l.* per fathom. The rise in the back of the 50, west of Plantation shaft, is worth 8*l.* per fathom. A winze in the bottom of the 50, east of shaft, is worth 10*l.* per fathom. The 70 end, east of King's, is worth 6*l.* per fathom. The lode in the back of this level is worth 18*l.* per fathom. The 70 end, west of Plantation shaft, has been unproductive for some little time, but within the past few days the lode has improved, and is now worth 8*l.* per fathom, and looks likely soon to become more valuable. We have to drive this level some 12 fms. less to reach the old boundary. Beyond that we have over 200 fms. in length on the course of the lode in entirely unexplored ground, when we can follow the lode to any depth. The Plantation shaft is sunk to the 80 in a good productive lode. The 80 end, west of the shaft, is worth 10*l.* per fathom. In the 80 end, east of King's shaft, we have a strong masterly lode, which is letting out water freely. The end at present is worth 8*l.* per fathom for tin, and looks likely to improve. The 93 ends east and west are suspended. We have lately holed the rise in the back of this level, and communicated with the 80, which has given good ventilation. We intend soon to resume driving the 93 east. The lode in the back of the 93 east is worth 20*l.* per fathom. Looking at the kindly appearance of the lode in the 80 end east, where we have a great extent of virgin ground before us, and at the improved prospects of the 70 end (west of Plantation shaft) as it is approaching the new ground, we consider the mine is likely to open out well both east and west.—WILLIAM RICH, WILLIAM WILLIAMS, HENRY ABRAHAM.

The CHAIRMAN formally moved that the accounts and agents' report be received and passed.——Mr. CLARKE seconded the resolution.

The CHAIRMAN said it was not necessary to detain the meeting with many remarks. The profit made was a little more than when they last met; it was then 3024*l.*, and it was now 3054*l.* The average price of tin had been 11s. per ton higher than last time. The amount of profit enabled the directors to recommend a dividend of 10s. per share.

The resolution for passing the accounts and agents' report was put and carried.

On the motion of the CHAIRMAN, seconded by Mr. CLARKE, a formal resolution was then passed declaring a dividend of 10s. per share.

The CHAIRMAN said that Capt. Rich, who was present, would be happy to answer any questions.

Capt. RICH said he had little or nothing to add to what was stated in his report They had had 10s. or 11s. per ton more for tin, but the costs had also somewhat increased. They had made considerable additions to the floors to catch the tin, but that had all been paid for out of the sales of ore as the work went on. They had sold over 9000*l.* worth of ore, which left a clear profit of over 3000*l.*, which was not bad, considering that tin was about half its normal price. He hoped the times would be better, and with better times he hoped and believed they would have better dividends, and that they would go on a little faster. They had sold a little more tin during the past 16 weeks. Then they had paid the lords' dues and the rates and taxes, so that 600*l.* or 700*l.* had come into the sheet which they could scarcely call the costs of the mine—at any rate, the rates and taxes could scarcely come under that head. It had been hard struggling. In Cornwall they laboured under the disadvantage of having deep mines, and the lords' dues were high, which was not the case with foreign mines, still the foreign supplies were somewhat decreasing, whilst the Cornish supplies were increasing. He hoped, therefore, better times were in store for all Coruish companies. The application of the Factory Act to the Cornish Mines had had an influence upon the costs of the mine.

On the motion of Mr. COULDEN, seconded by Mr. MACKAY, the committee were re-elected.——On the motion of Mr. HERITAGE, a vote of thanks was passed to the Chairman and committee, and the meeting broke up.

COLOMBIAN HYDRAULIC MINING COMPANY.

The statutory meeting of the shareholders was held at the company's offices, Winchester House, Old Broad-street, on Thursday,

Mr. J. T. P. PECHEY in the chair.

Mr. S. A. COBBETT (the secretary) read the notice convening the meeting.

The CHAIRMAN stated that this was the statutory meeting, which in accordance with the Act of Parliament they were compelled to call within four months of the registration of the company, but as the company had been so lately formed they had no report or accounts to present, and his remarks would be very brief. It would be satisfactory to the shareholders to learn that the amalgamation of the three companies had been successfully effected. Out of the 600 shareholders there were only three dissentients, and these were trustees of deceased or bankrupt shareholders. He might mention that the shares of the new company had been ready for distribution for the last month, and they would be glad if the shareholders would send in their old shares for exchange. The scheme adopted rendered it necessary for the new company to take over all the liabilities of the old ones, and those liabilities had now been mostly paid off, and he had great pleasure in informing them that the finances of the new company were in a satisfactory condition. They were authorised by the recoustitution to issue 5000*l.* of debentures, but since the formation of the company they had received 1600*l.* from the liquidator from the sale of a small coffee estate, and consequently they stopped the issue at 2860*l.*, and had now a working capital of between 1800*l.* and 2000*l.*, which would be sufficient to carry out intended operations. The shareholders would be anxious to know what was being done at the mines. They would remember that it was proposed to confine work to Malpaso, and to continue the new opening which had been commenced some time since, but the storms and floods which had of late prevailed in Colombia had shown that a new opening at that point was so liable to damage that it was impracticable, and, consequently, Mr. Welton had determined on opening at another point lower down the river. He would read them a letter which they had received from Mr. Welton, and the reply of the board to it. Writing with regard to the Malpaso new opening, he says:

Since my letter of April 17 I have had the ravine cleared of forest, and the brushwood partially cut from the intervening space from the ravine to our present works. I now find a considerable number of boulders lying on the slope on either side of the ravine, and this looks so much like high bedrock that I have resolved to suspend operations until pits can be sunk to ascertain the real depth of the bed-rock from surface. In the meantime I shall continue running across the channel directly over Clarke's shaft to the high banks on the south side of the channel, to find the rise in the bed-rock on that side, and to get into Clarke's rich gravel. The last run, as you see, shows an improvement, and with economy we can pay our way, and very probably soon get into good gravel. For the present, at Malpaso, I would do nothing but run across the channel. There is no doubt that the greater portion of the gravel to the south is just as good as any that has been washed, as it is impossible that in our narrow workings we should have hit upon the only good gravel. We are now going in below Clarke's "jump-up," so that we have 26 ft. more grade than we had with the old mine.

Replying to this, on Aug. 2, the board wrote: The board are quite of opinion that it would be a very risky matter, for the sake of obtaining only 15 ft. more grade, to commence an entirely new opening at another point until you have thoroughly tested the nature of the ground by means of trial pits, which they note you are preparing to do when the weather will permit. Bearing in mind the fact that by avoiding the "jump up" you can carry on your present sluice, to come in some 25 ft. deeper at or about the point which yielded for a short time such very large returns, they think perhaps you are adopting the wisest course to continue on this line for the present—especially when it is remembered that our present knowledge of Malpaso deposit leads us to believe that the grade of the deposit rises faster than the grade of the sluice—and so thoroughly develope to the very bottom that extensive part of the Malpaso Mine lying beyond your present works, and from which such large returns were at one time obtained at a level 25 ft. above that at which you will now come in.

Mr. Welton had also been investigating at Malabar, and believed that he had discovered on the other side of the ridge a point which would pay for working. With regard to this he would also read the letter and reply:—

MALABAR.—Since my letter of April 17 I have completely explored the ground behind our present banks, or between the hacienda house and Anderson's house; I have found the Spanish outlet with the bed-rock 50 ft. below where we are now working, and banks of coarse gravel, of which 60 ft. in height can be seen without any pipe-clay. The bank has no top dirt, and consists of gravel from the top downwards. The gravel gave from two to five colours in every pan I washed. This part of the mine can be worked for the present without making any new ditch or bulk-head; all that will be required is 300 ft. of sluices, of which the greater part can be old sluice, and to move the pipe over to the new point. I have opened a road from our present works to the new opening, and also a cut for the pipe. Have cut down the brushwood about the "frente," and made a bridge over the Medina river, so as to be able to reach Malpaso in an hour's time, and thus attend daily to the work at both mines. I believe I can get everything ready for turning the water on at the new point in six weeks time from this, or about the middle of July, at an expense of 200*l.*

To this the board replied:—

MALABAR.—The board note with much interest your explorations at this mine, and as the projected trial does not involve any extensive new work or large outlay, they are quite willing that you should make it. They do not, however, feel very sanguine as to the result, as it is evident that the point of operations is only transferred to the opposite side of the same ridge, which has already proved such an ignis-fatuus to the Malabar Company. However, as you inform the board that the projected new opening will be some 50 ft. lower than that on the other side, and that the character of the gravel is totally different, they only hope you may obtain profitable results. With the magnificent water supply at this mine, a very small percentage of gold will yield a profit if the banks are extensive, and you are not hindered as heretofore by pipe-clay.

He did not think it right to be too sanguine, but if Mr. Welton had not been mistaken they might hope soon to make a profit at Malabar as well as Malpaso. They had heard that the whole of the directors would retire at the present meeting, and he might mention that they had elected Mr. Herbert Sankey to fill up the vacancy at the board. Mr. Sankey would also retire, but, like themselves, was eligible for re-election.

A SHAREHOLDER presumed that the exploration at Malabar would not incur cost?——The CHAIRMAN said only about 200*l.* The question which always presented itself to him was why was not this followed before; but they were aware that the brushwood grows there very rapidly, and that nothing can be done without clearing it.

Mr. GRAY had no confidence in their superintendent—Mr. Welton—and suggested that a good man should be sent from this country to examine and report upon the property.

A SHAREHOLDER asked whether Mr. Gray proposed to supersede Mr. Welton?——Mr. GRAY: If necessary.——The SHAREHOLDER: Then I think this should be well considered before anything is done, as a new man would have to learn afresh what Mr. Welton had already learned.

The CHAIRMAN stated that the board had every confidence in Mr. Welton, who had been resident in the country 25 years, and was thoroughly conversant with the people and their language, which was a very important consideration in a country like that. He characterised the idea of sending an English miner to report on a hydraulic mining property as ridiculous in the extreme. The only way to do would be to send a Californian miner, and that would involve great expense, would waste their available capital, and in the end would teach them nothing that they did not already know. He would remind the shareholders that the only profit which had ever been made at Malpaso had been made under Mr. Welton's management; and, speaking for himself and his colleagues who had subscribed one-half of the debentures, they were fully satisfied to trust their interests in Mr. Welton's hands.

Mr. ROGERS thought the proposition the less necessary, as the Malabar property had already been for several years under the management of Mr. Anderson, one of the best Californian hydraulic miners, who had reported fully on all the properties of the company. Mr. Welton now thought he could do something for them, and they had better wait a little for the result.

Mr. Gray's proposition not having been supported the matter subsequently dropped, and Messrs. Cobbett, Hopkinson, Pechey, Rogers, and Sankey having been unanimously re-elected directors, the meeting separated.

HERODSFOOT LEAD MINE.

The quarterly meeting of shareholders was held at the offices of the company, on Thursday,

Mr. J. Y. WATSON, F.G.S., in the chair.

The notice of the meeting having been read, the CHAIRMAN stated that it appeared from the accounts to be presented to the meeting that the cost for the three months, including 142*l.* for the new shaft, had been 1076*l.* 6s. 2d. The lead ore sold for same period had realised 978*l.* 10s. 8d., showing a small loss, but there would have been a profit of about 180*l.* had lead maintained its price. The assets over liabilities were 650*l.* 4s. 1d., including old material sold, 139*l.*

The agent's report was then read and the accounts passed.

August 6.—I beg to hand you the following report on the state and operations of the mine. Since the last general meeting we have risen and sunk the new shaft 29 fathoms, and have 4 fathoms more to rise to communicate to the 190. This shaft will then be holed from the 147 to the 205. The lode in the rise is worth 20 cwts. of lead ore per fathom. Above the 147 we have old workings to pass through to the 127, where we calculate to fix our new balance-bob. The 205 has been driven south 8 fathoms through a good course of ore worth fully 20 cwts. of lead per fathom. In the last 3 fathoms driving the lode has been very changeable, and at times poor. The lode taken down last night appears to have passed the disordered ground and become more settled, and is worth 10 cwts. of lead per fm. The 205 north has been cleared, and driven about 4 fathoms; here the lode has been disordered and split up in branches, but still producing good saving work for the dressing-floors. On Friday last a branch of very rich ore was met with in the footwall of the lode, which is producing 10 cwts. of ore per fathom, and will soon fall in with the main part of the lode, where I expect a good improvement. The three stopes in the back of this level continue to produce about the average quantity of ore. No. 1 stope is worth 25 cwts. of ore per fathom. No. 2 stope is worth 13 cwts. of ore per fathom. No. 3 stope is worth 15 cwts. of ore per fm. The 190 has been driven north 11 fathoms; throughout this drivage the lode has been large, and good profitable stoping ground has been laid open. Prior to intersecting a small cross-course the lode was disordered, and is scarcely yet free from its influence, but the lode is producing good stones of lead ore, and is looking kindly for an improvement. From the appearance of the ground and the bunchy character of the lode through the mine I am of opinion that we have a great mine before us in this direction under the old workings where the great courses of ore were taken away in the upper levels. Our great object is to sink another lift 10 or 15 fathoms as soon as possible, as we have a good course of ore over 80 fathoms in length gone down in the bottom of the 205. We are now making preparation for sinking, and I hope before the next general meeting this work will be accomplished, and driving commenced on the course of the lode. During the past three months we have laid open some good stoping ground in the 190 north, which is more than what has been taken away in the south part of the mine, and I see no reason why our returns should not increase in the future. We are clearing a rise over the 80 to the 50 for ventilation and a new footway, &c. At surface we are still making some alterations in the dressing department. We have taken out eight heads of the old wood stamps, and replaced them with iron lifters and new frames. All other machinery throughout the mine is working satisfactorily.—P. TEMBY.

These accounts charged up three months cost to that last paid on July 18, and as there would be another month due in about a fortnight, it was proposed by Mr. F. F. WILSON, and seconded by Mr. PYNE, that the estimate of it be charged among the liabilities, but as it was explained by the agent that there was the lead raised against it on the mine, and the accounts as they stood showed three months costs against three months returns, the motion was not carried.

The agent of the mine, who was present, explained its position, and said he hoped to realise at least the same quantity of lead for the ensuing quarter.

Mr. SHARP stated that he had had the mine inspected by Capt. Southey, whose report summed up the prospects of the mine as "exceptionally good." The lode in the bottom level was large and the ore rich, but certain alterations were required and ordered to be carried out on the dressing-floors.

[For remainder of Meetings, see to-day's Journal.]

JAPANESE METALLURGICAL OPERATIONS.

We subjoin an interesting letter which appeared last week in our contemporary, Engineering, written by a gentleman who was for five years Lecturer of Metallurgy in Japan, and as a further illustration of the way in which the Japanese have foreshadowed some of our most scientific metallurgical discoveries we have also extracted the following from Dr. Percy's "Metallurgy of Iron and Steel" (page 816), feeling sure that it will be perused with great interest by many of our readers:—

"Mr. Clibborn communicated to the Royal Irish Academy on May 26, 1862, an interesting paper, in which he endeavours to prove that the Japanese forestalled Bessemer 300 years ago. In the English version of Mandelslo's Travels, published in London in 1669, it is stated (page 160) that 'they (the Japanese) have, among others, a particular invention for the melting of iron without the using of fire, casting it into a tun done about on the inside with about half a foot of earth, where they keep it melting with continual blowing, and take it out by ladles full to give it what form they please, much better and more artificially than the inhabitants of Liége are able to do.' Although the description is very defective yet I think it is sufficient to justify the conclusion that the Japanese method differed at least in two essential respects from that of Bessemer. The first is, that the air was not blown up through molten pig-iron, for if it had been the eruption so characteristic of the Bessemer process would speedily have occurred, and would certainly have attracted the attention of the traveller, who, however, makes not the slightest allusion to it. The second is, that supposing the molten pig-iron to have become decarburised it could not have been cast into sound articles in the manner described."

JAPANESE COPPER SMELTING AND MR. HOLLWAY'S PROCESS.

SIR,—I think it will be admitted that nowadays, on the announcement of any great and useful improvement in manufacturing processes, it has become quite fashionable on the part of smaller fry to rush into print, in some cases boldly setting up rival claims with the inventor or patentee, in others doing the same thing in a more modest and insinuative manner.

In February last Mr. Hollway read a very valuable and exhaustive paper on his processes for the reduction of sulphides by the rapid oxidation of their sulphur; and again has recently, as announced by you in your valuable Journal for the 11th inst., sent to the Society of Arts, before whom his original paper was read, a summarised account of his processes. Now, Sir, how is it that, so far as I am aware, we have not seen a single satellite come forth to cast a shade over the brilliancy of Mr. Hollway's successes? I am not sure that even Mr. Hollway himself will be quite satisfied by being thus left to his laurels, for even patentees, like other mortals, I presume, have a decided objection to being left quite out fashion. At first thought one is liable to attribute such neglect to one of two causes. Either that the metallurgical public look upon Mr. Hollway's processes as insignificant, if not valueless, or that he is the sole originator of the practical application of the principles involved in his processes. The former I am positive is not the case, and I am inclined to think that the latter is also not quite true.

During five years' residence in Japan, where I held the post of lecturer on metallurgy, it was my pleasant duty to make myself acquainted with the native processes of metallurgical practice. In one of my excursions I visited some copper works in Setsu, not far from Osaka, and was very much struck with the extremely simple, scientific, and yet rude process of smelting the roasted pyrites, the product being metallic copper in one operation. The following is a brief sketch of the process as I saw it conducted:—

The furnaces employed are of the usual Japanese type—a hole made in the ground lined with charcoal powder mixed with clay, applied moist. The dimensions are about 18 in. by 16 in. at the surface, and about 9 in. deep. This cavity is covered at about 6 ft. high with a large overhanging hood to carry away the smoke. There are two distinct stages in the operation:—

1.—Smelting the roasted ore for regulus.

2.—Reduction of the regulus to the metallic state.

The former lasts about four hours, the latter about three hours; there is no distinct break in the two, both being carried out during the one heat, and in the same cavity.

The first stage is of a very ordinary character, and is nothing more or less than fusing the ore, so as to allow the regulus to form and separate. A large quantity of slag is produced, which is removed at intervals, the regulus being allowed to accumulate in the furnace cavity. During this stage the blast is supplied from behind, and enters the cavity just below the top edge. Also a large clay cover is fixed across the back part of the furnace cavity, extending over about two-thirds of its width.

As soon as the last portion of the charge has been worked off the first stage is at an end, and the second stage commences. For this purpose the fire is thrown back, the back bellows stopped, and one bellow brought to the front, and a tuyere attached pointing downwards at about an angle of 75° with the surface of the molten regulus, which, the slag having been previously removed, is plainly visible. This completed, some loose tiles or covers are placed along the front edge of the cavity resting against the upper edge of the fixed back cover—these serve to retain the heat—which is further protected by covering the whole loosely with charcoal. From this time the operation proceeds by simply blowing a good blast of air well directed upon the surface of the molten regulus, which is oxidised and reduced accordingly; the heat produced from the reduction keeps the whole in a perfectly liquid fusion. During this stage a small quantity of slag is produced, a very little, if any, charcoal is used, and at the end a thin skin of regulus is removed, previous to removing the copper; this skin of regulus, no doubt, serves as a protection against excessive oxidation. The regulus is simply added to the next day's charge.

I have thought that it would be interesting to many of your readers to know a little of what is done in the Far East, and in the above account they will at once perceive the analogy between the second stage of the operation and Mr. Hollway's processes. The Japanese reduce their sulphide by blowing on the top, Mr. Hollway obtains the same result by the more rapid way of blowing through the mass. Again, the Japanese work with the rudest appliances, and on only a hundredweight at a time, Mr. Hollway has elaborate appliances and works on tons at a time. From the time of witnessing this operation I have been satisfied that sooner or later our modes of copper smelting would have to give way to more improved methods of like character to those above, and the idea of applying the Bessemer converter to the reduction of these sulphides often occurred to me, as I at once saw the principles involved were precisely the same. I may add that the above is not the universal method of copper smelting in Japan, they, like us, have also the slow and tedious processes of successive roastings and smeltings, and why I cannot say.—*St. George's, Wellington, Salop, July 22.* E. F. M.

THE WEST PATELEY LEAD MINES.

[FROM OUR OWN CORRESPONDENT.]

Pateley Bridge, Aug. 7.—The valuable discoveries recently made at these and other mines on Greenhow Hill have excited an interest growing in intensity as the developments progress. Seldom does it fall to the lot of the miner to discover continuous ore bodies yielding from 5 to 10 tons per fathom, especially under conditions so favourable for economical extraction.

From 1796 till 1876 no systematic operations had been carried on at the West Pateley Mines; they had been up to 1796 highly profitable to the depth below which it was then impossible to explore owing to the influx of water; but by the completion of the deep main tunnel—a work that has cost, probably, 20,000*l.*, and many years in point of time—this overwhelming difficulty has been for ever removed, unwatering the mines to a depth of 56 fathoms. Guided by the skill and experience of the manager, Mr. David Williams, M.E., less than three years of energetic working has made a comparatively barren moor the scene of an extensive industry.

The machinery consists of a 15-horse power Robey engine, with pulleys, drums for drawing from Craven Cross and Golden Fleece (or No. 2) shafts, working two saw benches, and an air-compresser for driving Cranston's rock-boring drills. Two sets of dressing-floors—that at Golden Fleece shaft consists of grates, jiggers, buddles, &c., and covered by substantial buildings, enabling the men to work throughout the year. The second set (also covered by substantial buildings), is close to Craven Cross shaft, and connected therewith by tramways to convey the ore direct to the slides, saving hauling and re-loading. Here are all necessary appliances, crusher worked by water-wheels, with power sufficient for operations upon a very large scale; the floors so arranged as to be easily extended. Five large reservoirs, some close to the floors, are supplied by leets, bringing water two or three miles, and after it has been used it flows into other ponds.

To provide against a dry summer three large additional reservoirs are to be made in the western section of the property in the direction of the East Grassington Mines, which contain the West Pateley principal lodes, besides others that have been rich in the Duke of Devonshire's Grassington Mines. In connection with the lower ponds, one of Tangey's engines is to be erected to force the water back to Craven Cross; thus the water will be used over and over again, ensuring sufficient at all times for dressing purposes. Adjoining the engine-house is a carpenter's shop, fitted with steam-saws, &c., ore-bins, store-houses, and a powder magazine, built as directed by Act of Parliament. The whole of these extensive surface works, adapted so as to minimise labour, are connected by an ample and well-laid system of tramways.

The Golden Fleece (No. 2) shaft has been sunk on the course of one of the veins to a depth of 32 fms.; well timbered and cased, and a substantial ladder-way from top to bottom. Its sinking has been suspended until the cross-cut from the 56 fm. level south-west intersects the vein and drains the bottom, materially economising the future working of this not unimportant section of the company's property, giving also 24 fms. of additional ore backs. In the 28 fm. level, extended upon the vein about 22 fms., the men receive 5*l.* per ton for raising, dressing, and making the ore ready for smelting, leaving a good profit; the 28 west has been extended upon the same vein, and cross-cutting south commenced to the parallel veins; from the one just intersected, although the drivage is not yet under where the course of ore was found near surface, good lead-stuff is being broken; in fact, enough ore was raised last month by the drivage alone to pay the cost of driving; in a few fathoms, judging by the surface workings, this lode, known as the Discovery vein, will yield profitable returns. The deep main tunnel not only entirely drains the mines, but in its course will open out the series of veins (14 or 15) to a depth of 56 fms.

The Craven Cross shaft is the principal point of operation. Its completion has taken a much longer time, and incurred a greater outlay than had been anticipated. Events are proving clearly enough that the manager showed great farsightedness in extending the deep tunnel about one quarter of a mile through the centre of the mines, effecting complete drainage without any machinery whatever—a feature the present and prospective value of which it is impossible to estimate unduly. Those best able to form an accurate opinion say that by this main tunnel the working facilities are such that a rib of ore of (say) 6 in. wide is as remuneratively valuable as a rib of ore 12 in. wide in any other mine. The pumping machinery alone would have cost at least 4000*l.*, and the pumping charges not less than 1500*l.* a year.

The Craven Cross shaft has been sunk so as to communicate with the end of the main tunnel sunk 12½ fms. below the 56; it is one of the deepest in the district, and has been completed in 18 months. Between the 56 and 67 there is a junction of two lodes; a course of ore is to be seen in the ends of the shaft going down to the next level, the 67. This level has been extended 14 fms. upon the Craven Cross vein south-east. Here it is about 2 ft. wide, of excellent matrix, carrying a branch of solid lead ore 2 to 3 in. wide. The fore-breast is now nearing the perpendicular of the ore body gone down in the soles of the level above. The 67 north-west has been extended from the shaft about 18 fms., and is within a short distance of coming under the great discovery made in the 56. The vein in the

end is already wider and richer than at the same point in the level above. As in the 56 this massive ore body is richer in the soles than in the roof; as no change whatever occurs in the formation, the miners naturally enough look for at least equal results in this deeper level.

This deposit was first met with in the 56, and for 17 fms. it has been a continuous course of ore, increasing in value every fathom. The ore when first cut was shapen like, and no thicker than, a knife-blade, but gradually increased until it was between 2 and 3 ft. wide of solid galena, admittedly the richest discovered in the district for many years, its average in metallic lead being upwards of 84 per cent. Four men have raised from the drivage of 16 fms. 70 tons —an average of 5 tons per fathom. It commands a higher price than ordinary lead, since it is especially suitable for tea-lead and chemical sheets. The last 12 fathoms the lode, between well-defined walls, has been upwards of 3 ft. wide, slightly underlying north. The indications are that this level is penetrating an enormous ore body. The roof and soles are and have been for more than 12 fms. a mass of solid galena, the end yielding from 5 to 7 tons per fathom. Feeders of spar and clay are now appearing in the end (important elements in enriching the value of a lode), and as the level is in unexplored ground—there being something like half-a-mile between the end and the boundary of the East Grassington Mines—certainly the miners in the locality have good reason for their belief that an immense body of wealth will be opened out upon this famous vein.

The best lead mines in the North, the Bollyhope (the richest in England), the Minera, and the Talargoch, which have paid some millions in dividends, are in the same formation, mountain limestone. Miners will appreciate fully the importance that the limestone here is overlapped by a considerable thickness of shale—our richest mines have found their greatest riches under such geological conditions. This it was which prevented the "ancients" following the veins on surface, leaving their wealth to reward the spirited West Pateley Company.

DETONATOR EXPLOSION.

The report of Major A. Ford, R.A., upon the enquiry made by him, as H.M. Inspector of Explosives, into the circumstances attending an explosion which occurred in the Detonator Factory of the Cotton Powder Company, near Faversham, on May 16, has just been issued. In the manufacture of the detonators the empty shells or capsules are put into a frame or jig of ebonite with a metal base, containing 100 holes, into each of which one shell fits, the open ends being upwards; and the composition, 2¾ ozs. to 100 detonators, is inserted, as in making caps. The jig with the charged shells is then removed to another building, where by means of a wheel 100 plungers are brought in one operation into the open detonators, pressing the composition into them with considerable force. An explosion of the very sensitive composition employed, and which consists of fulminate of mercury, chlorate of potash, and gun cotton, may in this operation very naturally be occasionally expected, and in order to protect the workman from its effects he is placed behind a wooden partition in the building in which the operation is carried on while working the wheel which puts on the pressure. This is an admirable arrangement, and if there be present in the building no explosive other than the composition in the detonators under pressure it is difficult to see how an explosion in the press can cause injury to the man so long as he stands thus under cover. A good illustration of the advantage of this arrangement is afforded by an explosion which took place during this operation on April 1, when the press was blown to pieces, but the man, sheltered by the partition, was uninjured. As soon as the requisite force has been applied the workman, still standing behind the screen, takes off the pressure; he then goes to the press and removes the jig containing the hundred pressed detonators. Holding the jig in his two hands he turns it upside down over a sieve which rests on a bucket containing water, in order that the detonators may fall out and be retained in the sieve, while any loose composition which may fall from the jig will pass through the sieve into the water. The detonotors are then put into a box with sawdust for removal to the packing house, the box being placed into a small cupboard with two doors opening inwards on hinges, one on the inside and the other on the outside of the building. An attendant can thus take away the finished detonators without entering the press house. The total amount of composition allowed at any one time in the building by the license is 2 lbs., whether or not contained in detonators, and the actual limit appears to have been only the charge contained in 100 detonators (2¾ ozs.), besides that in finished detonators in the cupboard, and such as might be adhering to the sieve or have fallen into the water in the bucket, as no more than one jig was allowed to be brought into the building at a time. One man only, Wm. Coulton Amos, aged 40, was employed in filling and pressing the detonators, and on the morning in question in pressing the third hundred an explosion occurred, which appears to have killed him on the spot. The deceased seems to have been nervous at the time. Chowler, the foreman, visited the place as usual to see that all was safe, and told Amos that a detonator explosion had occurred in Scotland, and that he must be specially careful to sponge away all loose fulminate. Emma Franklin overheard the conversation, and Amos said to her after Chowler was gone that he hoped he would not have his head blown off. Major Ford concludes that the explosion was brought about by Amos striking the rim of the sieve, on which there was doubtless some composition from detonators pressed the same morning, with the jig when turning it over; but whether it was so caused or by the falling of the detonators into the sieve, the occurence appears to have been purely accidental.

In the course of Major Ford's enquiry it came to light that Amos, who was required by the special rules made by the proprietors, and sanctioned by the Secretary of State, to change his ordinary clothes before going into a danger building for the working clothes without pockets provided by the company, had put on his working clothes over his own waistcoat and trousers on the morning when he met with his death, and had actually taken a bunch of keys in one of his pockets into the shed. Articles of iron and steel are in such a building eminently dangerous and expressly prohibited; it is not too much to say that a bunch of keys falling on loose fulminate on the floor could scarcely fail to cause it to explode. There are, it is true, certain risks which attach themselves to such a manufacture and can never be wholly eliminated, but here was one well understood and recognised, and provided against by a special rule, a breach of which would subject the offender to a penalty. Yet we find Amos, who had heard that morning of an accident in another factory and whose nerves appear to have been affected, and who had expressed himself to the effect that he "hoped he should not have his head blown off," nevertheless carrying with him into the shed this special element of danger and contravening a law made for his safety. The assistant foreman looked to see that he had on his proper clothes, but failed to notice that his ordinary clothes were underneath, a neglectful mode of making his examination which calls for censure. Major Ford does not think that in this instance there is any special ground for complaint against the Cotton Powder Company. The exceptionally dangerous nature of this work had perhaps not been fully recognised by them, but the great improvements which have been introduced into the manufacture, consequent on the recommendations made by Major Majendie after the former explosion, justify the expectation that with the increased experience now gained there will be no failure on the part of the company to prevent, as far as possible, a recurrence of the disaster.

ECONOMIC DREDGING PUMP.—Reference has several times been made in the *Mining Journal* to the improved pneumatic dredger introduced into this country by Mr. Charles Ball, C.E., of Fenchurch-street, and it will be gratifying to learn that the little impediments first met with have now been entirely removed, and the working of the pump leaves nothing to desire. The dredger has now been for more than a year in use in Lowestoft Harbour, and is now lifting to a height of about 10 ft. sand, stones, &c., up to 6 lbs. or 7 lbs. weight, the whole apparatus being driven with 60 lbs. pressure of steam in a small double cylinder engine 9 in. × 10 in., the boiler having 250 square feet of heating surface. Several very flattering certificates as to the working of the machine have been received, but that of Mr. Alf. Langley, the engineer of the Great Eastern Railway, explains most clearly the improvements which Mr. Ball has introduced, and which has made the dredger so complete a success. Mr. Langley writes that "since the introduction of the india-rubber attached to the fan-blades we have been able to do very much more work, with a considerable decrease in engine power. The india-rubber with us is the difference between success and failure. We have filled as much as 130 tons in 10 minutes on one occasion, but our average time for 130 tons is 20 to 25 minutes. The dredger is practically doing good work." The dredger is at present in daily operation, so that a visit to Lowestoft will well repay those interested in this class of work.

NOTE ON "CHRISTOPHITE" FROM ST. AGNES.

About a year since I received from our associate, Mr. Alfred Davies, of St. Agnes, a dark-brown mineral which was supposed to consist largely of sulphide of tin. As it differed greatly in appearance from the so-called tin pyrites, I at once felt interested in the supposed new mineral, and commenced an analysis which I have lately been able to complete.

It is generally granular in appearance, dark-brown, translucent very slightly on thin edges, infusible B.B., soluble more or less completely in aqua regia, &c.—in fact, its properties differ but little from those of an ordinary dark variety of blende, except that with careful manipulation it yields a bead of tin when treated with reducing agents on charcoal. Most specimens are massive, dark-brown and granular as stated above, but certain small cavities are usually studded with black lustrous crystals, generally minute, but occasionally about one-third of an inch across. The best of these crystals which I have seen exhibit planes of the hemihedral cube and of the positive and negative tetrahedrons. The mean of several analyses of the granular mineral is as follows:—

Zinc	32·0	per cent.
Iron	22·4	„
Tin	1·2	„
Sulphur	29·5	„
Alumina	7·2	„
Silica	6·8	„
Copper	trace	„
Lime	trace	„
Total	99·1	„

No alumina or silica can be detected in the crystals by blow-pipe tests, but I have not been able to obtain enough of them for a complete analysis. Still there can be no doubt that they are extraneous bodies, and form no part of the mineral as such. Eliminating these constituents we have the following as the probable composition of the mineral:—

Zinc	37·6	=	Zn S	56·1
Iron	26·2		Fe S	41·1
Tin	1·4		Sn S	1·9
Sulphur	34·7		S	·8
Total	99·9			99·9

The tin, I think, does really form part of the mineral and probably exists in the state of sulphide, as it is readily soluble in aqua regia, which solvent scarcely attacks native peroxide of tin in the slightest degree. The mineral is, therefore, very near that variety of blende named Christophite by Breithaupt from its occurrence at St. Christophe Mine, near Johanngeorgenstadt—differing from it only in the larger proportions of sulphide of iron (which is to the sulphide of zinc nearly as 6·5 in molecules) and of tin.

My friend Dr. C. O. Trechmann, of Hartlepool, to whom I showed the crystals referred to above, thus describes them:—"The blende is a very interesting though by no means an unusual development. The crystal are simple (*i.e.*, untwinned) and show the usual combination of the two tetrahedrons with the cube; the large development of the 2nd tretahedron is rather uncommon, and causes the whole crystal to approximate to a holohedral habit. That it is not holohedral is shown by the superficial character of the tetrahedral faces, those belonging to the first, probably the—tetrahedron, are large, bright (polished) and striated parallel to the edges formed by the cubical and 2nd tetrahedral faces, whilst the 2nd, probably the—tetrahedron is small, dull, and uniformly rough. This cube is striated parallel to the 1st tetrahedron.

A slight fracture has exposed the dodecahedral cleavage on the large crystal.

These crystals from St. Agnes are very similar to the beautiful crystals of the same combination from the Binnenthal (dolomite) in Switzerland; though in the latter the striations of the cubical faces generally run in the opposite direction." J. H. COLLINS.

— *Mineralogical Magazine.*

TECHNICAL EDUCATION IN GERMANY.

The great efficiency of the German institutions for the diffusion of technical knowledge has frequently been alluded to in the *Mining Journal*, and reference has several times been made to the Rhenish Westphalian Polytechnic School, at Aix-la-Chapelle, whose new calendar for 1879 80 has just been issued—the title of the institution now being changed to the Royal Rhenish Westphalian Technical High School at Aix la-Chapelle. The school will, with the October session, enter upon its tenth year of existence, and from the statistics published it is evident that excellent progress has been made. During the session recently closed there were 208 fully matriculated students, 32 non-matriculated students, and 11 hospitants. The great proportion of students are naturally natives of Prussia, but there were 20 from other parts of the German Empire; 44 from other European countries, 4 from South America, 1 from Central America, 1 from the East Indies, and 1 from Egypt, so that the utility of the school is very widely appreciated. The ages of the students vary from 17 to 31 years, the average being rather over 22 years. The professions to which the students intend to devote themselves are—architects, 44; engineers, 65; machine constructors, 65; chemists, 32; smelters, 26; surveyors, 7; and science teacher, 1. In the first week of June the students started upon their annual technical excursions to Berlin, where the architectural students were shown all the more remarkable buildings, old and new, in the capital, whilst the engineering and machine construction students were taken through the various establishments connected with their profession. The usual accompaniment of dinner and pleasure trips made the excursions very enjoyable, although they were not permitted to interfere with the larger amount of useful work to be got through.

The courses of study are admirably arranged to suit the requirements of the several classes of students, and the teaching staff includes 23 ordinary professors, 7 extraordinary professors, and 14 assistants, in addition to private tutors and others. The curriculum is so ordered that whilst every student must acquire a sound scientific education no one need study subjects which are unlikely to prove of real utility to him in after life. The total class fees, which are fixed according to the length of time occupied by the lectures, of course vary slightly according to the object which the student has in view, but it is mentioned by way of example that the first year's course for architects costs 7*l.* 5*s.* for a studirender (or fully matriculated student), and 10*l.* 4*s.* for a non-matriculant or hospitant (Zuhörer resp. Hospitant). An additional fee of 2*l.* 5*s.* per session is paid for use of the chemical laboratory, and 15*s.* per session for the physical laboratory. As the other expenses are by no means high at Aix-la-Chapelle the student can acquire a really useful technical education upon very reasonable terms, whilst the various students' clubs which have already been formed will aid in giving him all the knowledge possible without actual experience. There is a General Polytechnic Club; and the Architects, the Engineers, the Machine Constructors, and the Chemists and Smelters have each their special clubs bearing the names of their profession. There are the Delta, the Demokrit, and the Carolingia Academic Unions; the Rhenania, the Normannia, the Musical Union, the Quartet Union the Chess Club, and the Gymnastic and Fencing Clubs, so that the three or four years' course at Aix-la-Chapelle is not likely to be melancholy or to make the student feel, however hard he may have to study, that he is deprived of enjoyment. The calendar of the Technical High School of Aix-la-Chapelle should certainly be considered by all who have sons to educate.

THE COAL TRADE.

Mr. J. R. Scott, the Registrar of the London Coal Market, has published the following statistics of imports and exports of coals into and from the port and district of London by sea, railway, and canal during July, 1879:—

IMPORTS.

By sea.	Ships.	Tons.	By Railway and Canal.	Tons	c.
Newcastle	151	124,927	London & North-Western.	113,246	13
Seaham	80	14,601	Great Northern	90,094	0
Sunderland	96	66,270	Great Western	73,870	16
Middlesborough	7	1,670	Midland	158,052	0
Hartlepool	81	30,617	Great Eastern	44,729	3
Scotch	3	882	South-Western	3,951	1
Welsh	8	4,135	London, Chatm., & Dover.	1,478	0
Yorkshire	21	3,483	London, Til., & Southend	23	1
Small coal	6	4,432	South-Eastern	1,388	3
Cinders	3	533	Grand Junction Canal	362	0
Total	406	251,550	Total	486,894	17
Imports—July, 1878	381	221,357	Imports during July, 1878	408,329	8

Comparative Statement, 1878 *and* 1879.

By Sea.	Ships.	Tons.	By Railway and Canal.	Tons.	c.
Jan. 1 to July 31, 1879	2838	1,880,363	Jan. 1 to July 31, 1879	3,749,517	6
Jan. 1 to July 31, 1878	2832	1,728,182	Jan. 1 to July 31, 1878	2,090,966	2
Increase—1879	6	152,181	Increase—1879	658,551	4
Decrease—1879	—	—			

EXPORTS.

Railway-borne coal passing *in transitu* through district	Tons	81,655
Sea-borne coal exported to British possessions or to foreign parts, or to the coast	Tons	38,822
Ditto, sent beyond limits by railway		11,759
Ditto, by canal and inland navigation		950 = 52,531
Railway-borne coal exported to British possessions, or to foreign parts, or the coast		34,964
Ditto, by canal and inland navigation		27 = 34,991
Sea-borne coal brought into port and exported in same ships		1,062
Total quantity of coal conveyed beyond limits of coal duty district during July, 1879		170,239
Ditto, July, 1878		152,439

Comparative Statement, 1878 *and* 1879.

Total distribution of coal from Jan. 1 to July 31, 1879	1,322,039
Ditto, Jan. 1 to July 31, 1878	1,207,235
Increase in the present year	114,804

General Statement, 1878-1879.

Increase in coals imported by railway	658,551	
Increase in coals imported by sea	152,181 =	810,732
Less increase in coals exported		114,804
Total increase in trade within the London district		695,928

A very depressed condition still pervades the metal trade generally; there has been just a rally in pig-iron, and also in the spelter market, otherwise prices have remained very stagnant throughout the past month.——IRON: Pigs show a few pence advance both in Scotland and the North of England, but the trade in finished iron during the month of July was exceedingly limited. In the East the demand has fallen off very considerably for all descriptions, and to the Australian colonies and New Zealand there is less doing than for a long period past. The Americans are purchasing some quantities of old material, and there has been a slight demand for pig-iron, also for steel rails, the demand for the latter being a question of quality solely. On the whole the trade is yet a long way off any radical change for the better, and there are still many who believe in a worse state of matters in the iron trade before any real sound demand can be looked for.——COPPER: The imports steadily increase, the stocks also, and the price as steadily goes down; nevertheless there is a large trade for export as well as home consumption doing, and it is only the pure state of fright existing amongst the trade themselves and the entire want of demand from the outside public which keeps the market in its wretchedly inactive state. There cannot be a doubt that looking at the real state of trade in copper prices are far lower than they need be, and a bold move on the part of consumers as a body would advance prices 15 to 20 per cent. in a few weeks. Copper has not increased in supply like iron, stimulated by the enormous prices ruling in 1872-3; on the contrary, the supply is decreasing, while the demand for home consumption has increased in the last five years, and the export likewise. The stocks are apparently large, because of the removal to England of all the available copper on the Chili coast, simply as a measure of precaution occasioned by the state of war between Chili and Peru, and because also of the utter demoralisation of consumers here, who lack the courage to hold a ton of raw material more than they have orders for in finished metal. All this will, of course, change directly genuine demand springs up, or a bold investor is in the market. Meantime, selling copper uncovered becomes a matter of very dangerous speculation, as a sharp reaction may set in at any moment.

We subjoin our usual monthly statistics:—The imports of copper into England for the six months of the following years were: 1875, 43,253 tons; 1876, 39,273; 1877, 45,009; 1878, 40,959; and 1879, 48,670 tons. The exports for the same periods were: 1875, 23,418 tons; 1876, 24,623; 1877, 24,920; 1878, 29,174; and 1879, 29,053 tons. The position from August 1, 1878, to August 1, 1879, was as follows:—

	Price.	Stock on hand.	Stock, including afloat and chartered. Advised by mail only.
1878—August 1	£ 61 10 0	.....Tons 38,913	.....Tons 43,325
September 1	60 15 0	 38,676	 44,985
October 1	60 0 0	 39,097	 44,757
November 1	57 0 0	 39,712	 47,567
December 1	59 0 0	 39,008	 47,073
1879—January 1	58 0 0	 37,890	 48,474
February 1	56 0 0	 39,538	 47,153
March 1	55 0 0	 39,452	 48,266
April 1	56 0 0	 39,752	 49,051
May 1	56 0 0	 41,624	 48,965
June 1	55 0 0	 41,269	 48,432
July 1	56 0 0	 41,877	 50,447
August 1	53 10 0	 42,395	 51,011

And the comparative positions at the same date of the past four years with the present:—

	Price.	Stock.	Stock, including afloat and chartered. Advised by mail only.
1875—August 1	£ 79 0 0	.....Tons 22,828	.....Tons 29,704
1876—August 1	72 0 0	 25,596	 31,803
1877—August 1	69 0 0	 29,893	 34,513
1878—August 1	61 10 0	 38,913	 43,325
1879—August 1	53 10 0	 42,395	 51,011

The charters to July 31, 1879, were 30,600 tons, against 26,250 tons in 1878.——TIN: This has been a dragging market throughout the past month, prices fell about 1*l.*, but the amount of business done, especially in foreign, has been much more limited than usual, the supplies to the home trade would appear to have been almost entirely satisfied by the English smelters. Tin-plates are hardly in such good request for America, but there has been a slightly better demand from Eastern markets.——SPELTER: A very rapid and entire change has come over spelter. Producers having arrived at the conclusion that they need no longer give away their property. Spelter at 13*l.* 15*s.*, at which it stood a very short time back, is the cheapest price touched since 1854, when for a few weeks it was only a trifle over 12*l.*——LEAD: A fractional advance was established in this metal last month, and there was a somewhat better trade done. America is taking lead from here now in small quantities. The Chinese demand is smaller than usual.—*Leadenhall-street, Aug. 7.* HENRY ROGERS, SONS, AND CO.

COPPER: On July 15 1146 tons Wallaroo cake were offered for sale at public auction, but no bid being elicited that was acceptable to the importer the entire quantity was withdrawn. Although the parcel has since been disposed of on private terms the market was adversely affected, and Chili bars, g.o.b.'s, have been sold as low as 53*l.* Charters were cabled for the first half of July as 2000 tons, and for the second half 2800 tons. We quote—Chili bars, 53*l.* to 53*l.* 10*s.* for g.o.b.'s to named brands; Wallaroo and Burra, 60*l.* 10*s.*; tough, 58*l.* to 59*l.*; manufactured, 63*l.* 10*s.* to 64*l.*; ore and regulus, 10*s.* 3*d.* to 10*s.* 9*d.* per unit. The imports and exports for the six months, January to June were, by the Board of Trade Returns—

IMPORTS.	1879.	1878.	1877.
Ore Tons	48,799	44,904	39,869
Regulus	24,506	16,288	17,872
Copper	22,965	18,709	20,964
EXPORTS.			
Foreign raw	7,334	6,102	7,449
English raw	7,699	10,826	5,125
Manufactured, including yellow metal and brass	16,182	13,078	14,180

——TIN: This market has shown extreme lassitude during the past month, consumers and dealers restricting their purchases to bare necessity. The statistics however continue to favour holders. For the past seven months the deliveries of Straits and Australian largely exceed the shipments, a feature quite new during the last few years, and the total visible supply now nearly approximates to that of last year. Deliveries from London were 1128 tons, and from Holland 677 tons. Below we give our usual statistics:—

	1879. July 1.	1879. Aug. 1.	1878. Aug. 1.	1877. Aug 1.
Foreign in London Tons	10,488	10,419	10,070	9,609
Banca in Holland	1,554	1,944	1,525	1,482
Billiton in Holland	1,984	1,845	1,622	1,605
Afloat for Europe, Straits, advised by mail and wire	400	240	500	70
Afloat, Australian ditto	1,200	1,060	1,850	2,300
Afloat, Billiton	1,380	1,125	1,000	800
Banca in Dutch Trading Co.'s hands	1,265	688	902	1413
Banca afloat, by sailing vessels	425	450	200	75
Total	18,696	17,771	17,669	17,354

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PARIS, BRONZE MEDAL, 1867.

ORDER OF THE CROWN OF PRUSSIA.

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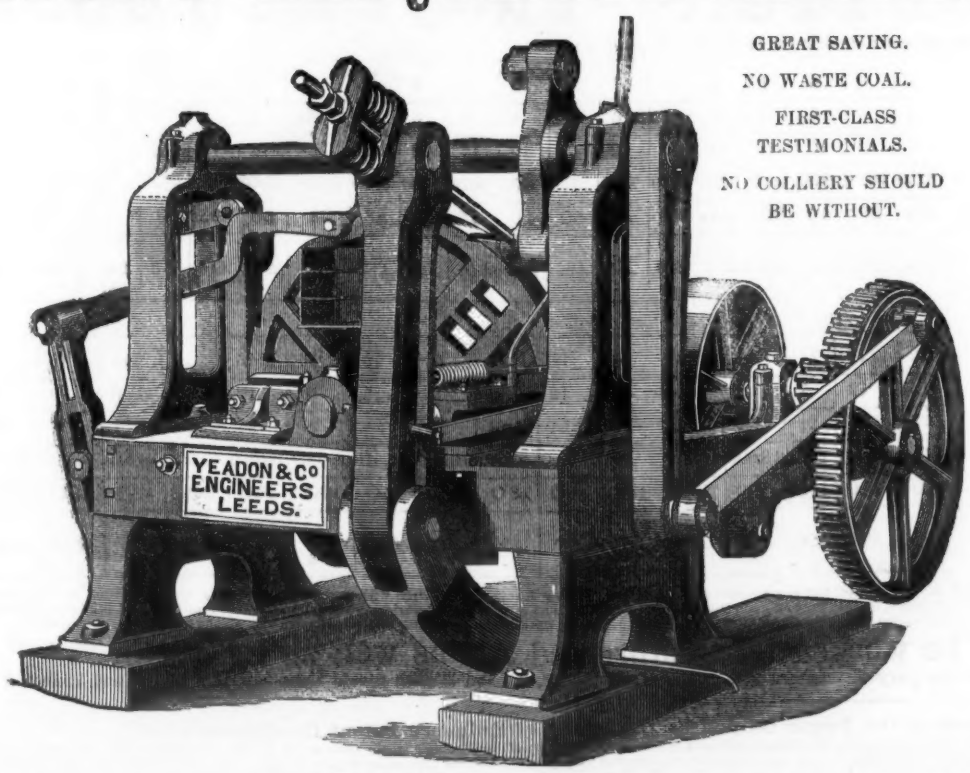

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GAS PUDDLING FURNACES.—The invention of Mr. W. HARKNESS, of New York, relates to puddling furnaces adapted for gaseous fuel, and the process of employing as a fuel gas resulting from the decomposition of steam in puddling furnaces. The furnace is provided with two bowls or boshes separated by a bridge, above which another bridge or arch is placed. Above the main arch of the furnace is a heating chamber with compartments, and provided with flues which pass into the furnace. A pipe conveys the air from the air blower to the heating chamber, and another pipe conveys the gas from the gas holder or gas generator to the heating chamber. The invention is equally applicable to single, double, and rotary furnaces.

Printed by RICHARD MIDDLETON, and published by HENRY ENGLISH (the proprietors) at their offices, 26, FLEET STREET, E.C., where all communications are requested to be addressed.—*August 9, 1879.*